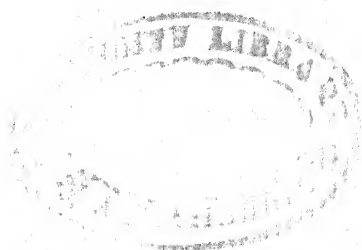


Supplement to flora of the
Upper Ganges Plain.
By B. Raizada
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An-IV-179

RANUNCULACEÆ

✓ **Clematis cadmia** Buch.-Ham. ex HK. f. & Thoms. Fl. Ind. 5, 1855 & in FBI. 1: 2, 1892; Raizada in Journ. Ind. Bot. Soc. 14: 340, 1935.

A slender climber with ternately decompound leaves and solitary axillary and bluish-white flowers; peduncles long with two leafy bracts about the middle. Achenes large, many, glabrescent, without feathery styles, with a short straight beak.

Kusamhava, Gorakhpur, P.C. Kanjilal, Dehradun Herb. No. 52609; Saklni forest, Gorakhpur, Sri Ram, 2692.

Flowers: Feb.-March. *Fr.* March-April.

Distribution: East Bengal and along the base of the Himalaya from the Kosi to Assam; Burma.

Clematis grata Wall. Pl. As. Rar. 1: 83, t. 98, 1830; HK. f. & Th. in FBI. 1: 3, 1872; Som Deva in Bull. Bot. Surv. India 10 (2): 179, 1968.

A climber. Leaves pinnate, a few bipinnate or trifoliate; leaflets ovate, 2.2-7.5 cm long, incise-serrate, sometimes deeply 3-lobed or-partite, hairy on both sides or glabrate above. Flowers fragrant, 1.5-2 cm across, in large leafy panicles. Sepals cream coloured, spreading.

Near Robber's Cave, Dehra Dun, Som Deva 2840, in open sunny situation, spreading on bushes.

Fl. Nov.-Jan. Fr. Jan.-Feb.

Distribution: -Western Himalaya, 600-2400 m, China, Africa.

Delphenium denudatum Wall. ex Hook. f. & Th. Fl. Ind. 49, 1855 and in Hk. f. FBI. 1: 25, 1872; Collett, Fl. Sim. 12, t 4, 1921; S.K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6 (1): 39, 1971,

A herb 30-90 cm high. Radical leaves long petiolate orbicular, 5-9 partite, segments pinnately lobed, often toothed; cauline leaves few, shortly petiolate, or the upper sessile, deeply 3-or more-lobed, lobes entire or pinnatifid. Flowers deep blue, single, supurred, 2.5-4 cm long, spur cylindric, nearly straight, Sepals spreading, varying from deep blue to fadded grey. Petals blue, the lateral ones 2-lobed, hairy. Follicle many-seeded, tipped with the persistent styles.

Sahasradhara, along moist rocky slopes, S.K. Malhotra 31266.

This species is common in Mussoorie and, I strongly suspect that Malhotra's specimen quoted above is from an elevation of over 1000 m. from the higher cliffs of Sahasradhara hills which definitely will not fall within the region of this flora. Unfortunately Malhotra has not given any definite locality or elevation for the specimens he has collected from Sahasradhara.

Naravelia zeylanica DC. Syst. 1:167, 1818; HK. f. & Thoms. in FBI. 1:7, 1872. *Atragene zeylanica* Linn. Sp. Pl. 542, 1753; Raizada in Journ. Ind. Bot. Soc. 14: 341, 1935.

A climbing shrub; leaves 3-foliate, but the terminal leaflet modified into a tendril. Flowers yellowish-green; panicles lax, usually longer than leaves. Sepals 4, pubescent externally, caducous. Petals 6-12, linear spathulate. Achenes linear with long hairy styles.

Dogari, Haldwani division, 270 m, *A.E. Osmaston* 1318.

Fl. Oct.-Dec., *Fr.* Dec.-March.

Distribution:- Tropical forests of the Himalaya, from Nepal eastwards, Bengal, Assam, W. Peninsula; Ceylon, Java.

✓ *Ranunculus arvensis* Linn. Sp. Pl. 780, 1753; Hk. f. & Thoms. in FBI. 1:20, 1872; Raizada in Journ. Ind. Bot. Soc. 14:341, 1935.

An erect nearly glabrous, much branched annual herb. Radical leaves long petioled, spathulate or wedge-shaped, 3-5-toothed at the tip, or the lamina deeply 2 parted, cauline 3-partite. Flowers long stalked, 9-12 mm in diam. Petals 5, yellow. Achenes flattened, spinous, beaked.

New Forest, Dehra Dun, common in wheat fields, *Raizada* Dehra Dun Herb, No. 51963; Kaulagarh, Dehra Dun, *Gupta* Dehra Dun Herb, No. 20384, common in wheat fields.

Fl. Feb.-March *Fr.* March-April.

Distribution:-W. Himalaya, 1200-2,100 m; N. Asia, Europe.

Ranunculus laetus Wall. ex Royle, Ill. Bot. Him. 53, 1834; HK. f. & Thoms. in FBI. 1: 19, 1872; Raizada in Journ. Ind. Bot. Soc. 14: 341, 1935.

An erect perennial herb, usually appressedly hairy. Radical leaves long petioled, rounded in outline, 5-10 cm across, deeply 3-lobed. Flowers long stalked, 1.8-2.5 cm across. Sepals 5, villous. Petals 5, yellow; achenes glabrous, flattened, faintly dotted, margins thickened.

Kaulagarh Tea Estate, Dehra Dun, *Raizada* Dehra Dun Herb. No. 53543.

Fl. Feb.-March. *Fr.* March-April,

Distribuion:-W. Himalaya, 1,200-2,100 m. N. Asia, Europe.

Ranunculus muricatus Linn. Sp. Pl. 555, 1753; HK. f. & Th. Fl. Ind. 139, 1855 and FBI. 1: 20, 1872; Raizada in Journ. Ind. Bot. Soc. 14: 341, 1935.

An erect glabrous annual herb; leaves 3-fid. Flowers yellow. Achenes in a large globose head, tubercled.

Chandbagh, Dehra Dun, *Gupta* Dehra Dun Herb. No. 41745.

Fl. March-April. *Fr.* April-May.

Distribution:- Swampy places, at low elevations in the Punjab—Himalaya, and in the plains at Peshawar and Ambala; Europe, W. Asia, N. America.

MAGNOLIACEÆ

Michelia champaca Linn. Sp. Pl. 536, 1753; Hk. f. & Th. in FBI. 1: 42, 1872; A.E. Osmaston, For. Fl. Kumaon 7, 1927; Raizada in Ind. For. Rec. (n.s.) *Botany* 4 (3): 65, 1950.

This tall handsome tree is commonly planted near temples and round villages throughout the area. At Bhalaon near Ramnagar, however, it is found growing in ravines in 'Sal' forest and is either truly indigenous or has run wild and become naturalized. Flowers very fragrant.

Bhalaon, Ramnagar Div., A.E. Osmaston 1187.

Fl. April-July. *Fr.* May-Oct.

Distribution :-Commonly cultivated, but wild in the forests of the Temperate Himalaya from Nepal eastward, Burma, Nilgiris and Travancore; Java.

ANNONACEÆ

Uvaria hamiltoni Hk. f. and Th. Fl. Ind. 96, 1855 and in FBI. 1: 48, 1872; King in journal. Ast. Soc. Bengal 61 (2): 13 and in Ann. Roy. Bot. Gard. Cal. IV: 17, t. 6, 1893; Raizada in Journ. Ind. Bot. Soc. 14: 341, 1935.

An evergreen scandent shrub; young parts rusty tomentose. Leaves pubescent above, stellately tomentose beneath, about 10-25 cm long, 6-12 cm broad. Flowers brick red, about 4 cm across; pedicels 2 cm long, elongating in fruit. Ripe carpels baccate, ovoid, rufous tomentose, scarlet, many-seeded.

Domakhand, Gorakhpur, Divisional Forest Officer Gorakhpur, Dehradun Herb. No. 10114, 10115; Sri Ram 2479 (same locality); New Forest, Dehra Dun, cultivated, *Raizada* Dehra Dun Herb. No. 81227, 81228, 100566.

Distributions.—Sub-Himalayan tract from Sikkim-Terai, Behar near Monghyr and Assam, Khasi Hills, Chota Nagpur, Eastern Bengal, Upper Burma.

MENISPERMACEÆ

Stephania elegans Hk. f. & Thoms. Fl. Ind. 1: 195, 1855 and in Fl. Br. Ind. 1: 103, 1872; Collett, Fl. Sim. 18, 1902, S.K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6 (1): 39, 1971.

A glabrous dextrose climber, 0.6-3.5 m long. Leaves triangular-ovate, 5-12 × 3-7 cm, peltate, pale beneath, entire, acute; petiole 1.2-5 cm long. Flowers purple red, minute, in axillary long-peduncled solitary umbels. Drupe pink or red; endocarp with transverse ridges.

Sahasradhara, S.K. Malhotra 23783.

Fl. June-July. Fr. July-Aug.

Distribution.—Subtropical Himalaya from Kumaon to Sikkim, 1500-2100 m; Khasi Hills.

This species like *Delphinium denudatum* Wall. is fairly common in Mussoorie below Bhatta Dhobighat, in sunny places and twining around grasses and shrubs. Almost certainly Malhotra's specimen from Sahasradhara has been collected from much above 1000 m and as such the area does not fall within the limits of Duthie's Flora of Upper Gangetic Plain.

Tinospora sinensis (Lour.) Merr. in Sunyatsenia 1: 193, 1934 and in Trans. Am. Philosop. Soc. Philad. N.S. 24: 158, 1935;

Santapau & Janardhan in Bull. Bot. Surv. Ind. 10: 368, 1968.

Campylis sinensis Lour. Fl. Cochinch. 113, 1790; *Menispermum malabaricum* Lamk. Encycl. 4: 96, 1797.

Tinospora malabarica (Lamk.) Hook. f. & Thoms. Fl. Ind. 183, 1855; Hk. f. and Th. in FBI. 1: 96, 1872; Miers in Annals Nat. Hist. Ser. 3, 13: 318, 1863 and Contrib. 32; Diels in Pflanzenr. 46 (IV-94): 142, 1910; Raizada in Journ. Ind. Bot. Soc. 14 (4): 342, 1935.

A climber with cordate leaves pubescent above whitish tomentose beneath; shoots pubescent. Ripe carpels crimson, endocarp tubercled,

Fairly common throughout the area, climbing tall trees in cool situation.

Fl. Feb. March. Fr. May-June.

Distribution.—Western Peninsula, Sikkim, Khasi Hills and Chittagong.

This species has long been taken for *Tinospora cordifolia* (Willd). Hk. f. & Thoms. which, however, differs principally in having smaller glabrous leaves, concave inner sepals and a smooth endocarp.

PAPAVERACEÆ

- ✓ *Argemone ochroleuca* Sweet, Brit. Fl. Gard. 3. t. 242, 1828; Ownbey in Mem. Torr. Bot. Club 21: No. 1, 1958; C.S. Venkatesh, Proc. 47th Indian Science Congress 47:401, 1960 & Curr. Sc. 31 (6): 250-251, 1962.

This species differs from *Argemone mexicana* L. in its whitish or lemon-yellow flowers. It has recently been shown to be cytologically a distinct species, being octoploid (S.K. Malhotra in Curr. Sc. 29: 282, 1960).

Rispana, Dehra Dun, C.R. Babu 35202.; Delhi. C.S. Venkatesh. A recently introduced weed.

This species differs from *A. mexicana* L. in that this species has lemon-yellow or whitish petals which are upto 3.5×2 cm, oblong buds, and narrow stigma spreading widely, while in the former species petals are bright yellow upto 2×1 cm, buds subspherical and stigma broad, closely crowded together and appressed to the style.

Argemone subfusiformis Ownbey in Brittonia 13: 97, 1961; subsp. *subfusiformis* Ownbey in Brittonia 13: 102, 1961; C.P. Malik & I.S. Grover in Ind. For. 95 (6): 480, 481, 1969 & Sc. & Culture 41 (5): 220-223, 1975.

A herb pale-green in colour; stem sparingly prickly. Flowers lemon yellow, 2.8-4.6 cm in diameter, flower buds oblong; sepal horns 10-14 mm, stigma lobes narrow, spreading, not appressed. Fruit fusiform or spindle shaped, $3.9 \times 1.4-4.5 \times 1.5$ cm.

Udaipur, Malik & Grover.

Fl. & Frs. April-Nov.

Distribution :—Argentina, Bolivia, Chile, Peru and Ecuador.

Argemone mexicana and *A. subfusiformis* shared similar habitats and in various places grow intermingled with each other. Apparently the two species according to Grover & Malik (Sc. & Culture l.c.p. 22) were morphologically and cytologically sufficiently close and had very weak barriers to gene flow. Despite this, they maintained their individual specific status.

Malik & Grover (Ind. For. 95 (6): 480, 1969) give the principal morphological features that distinguished the species

now found in India viz. *A. mexicana*, *A. subfusiformis* and *A. ochroleuca* (Venkatesh 1962) in a tabular form which can be used in the field or fresh specimens to separate the 3 species.

CRUCIFERÆ (BRASSICACEÆ)

Lepidium perfoliatum Linn. Sp. Pl. 643, 1753; Chapman, Tutin & Warburg. Fl. Br. Isles 178, 1951; Raizada in Proc. Nat. Inst. Sc. Ind. 24 (4): 199, 1958.

An annual or biennial herb with single erect stem 20-40 cm, sparsely hairy, usually branched above. Basal leaves upto 10 cm, long-stalked, bipinnate, the alternate segments less than 1 mm wide; middle and upper stem leaves 1-1.5 × 1-1.5 cm, broadly ovate, acute, entire, clasping the stem with large basal lobes. Petals pale yellow, half as long again as the sepals. Fruiting stalks ascending, glabrous, equalling the fruit; siliculæ variable in shape but usually about as broad as long, 3-4 mm, valves keeled below, very narrowly winged above; style usually projecting beyond the apical notch of the fruit. Seeds 4-6 in a cell, pale, smooth.

Laxmi Road, Dalanwala, Dehra Dun, Raizada Dehra Dun Herb. No. 11279. A herb near water channel, not common.

Fl. March-April.

Distribution:—East Europe and West Asia, introduced throughout the rest of Europe and in N. Africa and N. America.

Lepidium ruderalis auct. non Linn. Sp. Pl. 645, 1753; Hk. f. and T. Anders. in FBL 1: 160, 1872; Raizada in Proc. Nat. Inst. Sc. Ind. 24 (4): 199, 1958.

An erect foetid annual herb, 10-60 cm high. Radical leaves 2-pinnatifid, cauline sessile, toothed; upper linear, lower broadly lanceolate or lanceolate. Flowers 1 mm across. Pods orbicular, laterally compressed at right angles to the septum, 2-3 mm across, retuse at the tip. Seeds 2, one in each cell, red, compressed.

New Forest, Dehra Dun, Raizada Dehra Dun Herb. No. 113072 and 113073.

Fl. May-June, Fr. July-Sept.

Distribution:—Temperate Western Tibet, west ward throughout Europe.

It is a temperate Himalayan herb, common in the hills 2000-4000 m. Its occurrence in Dehra Dun is presumably due for its seeds having been brought down in the streams.

This Linnean species may not occur in the area, what is recorded under this name is *L. virginicum* Linn. *L. ruderale* L. is apetalous.

Lepidium virginicum Linn. Sp. Pl. 645, 1753., Chapman, Tutin & Warburg Fl. Br. Isles 177, 1951; Thell. Die. Gatt. Lepidium 222, 1906; Babu in Bull. Bot. Surv. Ind. 8 (2): 200, 1966. *Lepidium ruderale* auctt. non Linn. 1753.

An annual or biennial herb with single erect stem 30-50 cm, more or less downy with long downwardly curved, appressed, simple hairs on raised bases. Basal leaves upto 8 cm, rough with short curved bristles, lyrate or pinnate with large rounded terminal lobe and numerous much smaller lateral lobes; middle and upper stem leaves simple, with sharply toothed and hairy margins the uppermost only 15×2 mm. Flowers inconspicuous, white. Petals 4 as long as the sepals in the first opening flowers, becoming shorter. Stamens 2-4. Fruit-stalks upto half as long again as the fruit; the siliculae $3.4 \times 2.4-3$ mm, orbicular with a broad but shallow apical notch; valves sharply keeled below, narrowly winged above, shining when ripe; style very short at the base of the notch. Cotyledons accumbent. Hardwar Road, Dehra Dun *Balapure*. Robber's cave. Dehra Dun, T. A. Rao B.S.I. N. C. No. 1190; Rispana, Dehra Dun, C.R. Babu 3244. Harbanswala Tea Estate, Dehra Dun, N. P. Singh 19765.

Fl. & Fr. April-Sept.

Distribution:-Naturalised in N. America but introduced in many parts.

Rorippa dubia (Pers.) Hara in Journ. Jap. Bot. 30: 196, 1955. *Sisymbrium dubium* Pers. Synop. Pl. 2: 199, 1806. *Nasturtium heterophyllum* Bl. Bijdr. 2: 50, 1825 (Dec.) non. D. Don 1825 (Feb.) *Nasturtium indicum* sensu Hk. f. and Ander. in Fl. Br. Ind. 1:134, 1872. promini parte (non DC. 1821). *Rorippa indica* (DC.) Hochr. var. *apetala* (DC.) Hochr. in Candollea 2:370, 1925. *Nasturtium indicum* var. *apetalum* DC. Prodr. 1:139, 1824. *N. sinapsis* Schulz in Fedde, Repert. 33:278, 1934.

Decumbent-ascending, annual-biennial herbs, from a creeping base, 10-20 cm tall. Stems glabrous except hairy young parts. Lower leaves long-petioled, lyrate-pinnatifid with 1-2 segments on either side, upper ones short petioled or sessile, obovate-oblongate, entire, irregularly serrate-dentate, apiculate. Flowers yellow, in racemes of 6-10 cm long; pedicels erect or erecto-patent, 0.2-0.25 cm long during anthesis, after wards 0.3-4 cm long. Sepals oblong, erect, 0.25 cm long; petals absent,

filaments 0.2 cm long; stigma subsessile or about .02-.03 cm long. Pods 2-2.5 (-3) cm long; seeds uniseriate .05 × .05 cm.

Bindal, Dehra Dun C.R. Babu 35006; common in humid shady localities and wall margins.

Fl. & Fr. Nov.-May (July)

Readily distinguishable from *R. indica* (Linn.) Hiern. (= *Nasturtium indicum* (L.) DC.) to which it is closely allied by apetalous flowers.

Incidentally it may be pointed that *Nasturtium diversifolium* Wall. (Cat. No. 4775, 1838)-a nomen nudum, has been reduced by Jackson (Index Kewensis 296, 1895) to *N. palustre* (Pollich) DC. (= *Rorippa islandica* (Oeder) Borbas, but a critical study of the type specimen (Wallich 4775-in Herb. Cal.) reveals that *N. diversifolium* Wall. is conspecific with *R. indica* var. *benghalensis* (DC.) Raizada com. nov. (*N. indicum* var. *benghalense* Hk. f. & T. Anders. in Journ. Linn. Soc. 5: 139, et in FBI. 1: 134, 1872; *N. benghalense* DC. Syst. 2:198, 1821), not with *Rorippa islandica* Borbas.

CAPPARACEÆ (incl. CLEOMACEÆ)

Cleome burmanii W. & A. Prodr. 22, 1834; Hk. f. and Th. in FBI 1:170, 1870.

An annual; branches glabrous prickly; leaves 3-foliolate. Flower solitary, axillary, purple. Capsule stalked, 5 cm long, terete. Seeds glabrous, transversely rugose.

Fl. & Fr. August-Sept.

Distribution:—Karnataka, South India, Burma & Ceylon.

Airy shaw (Kew Bull. 18:256, 1964 and J.C. Willis, Dict. Fl. Pl. 254, Rev. ed. 7, 1966) erected a new family *Cleomaceae* (Pax) Airy Shaw, comprising the subfamily *Cleomoideae* of *Capparaceae* and states that 'The *Cleomaceae* are a logical necessity, while they show some resemblances to *Capparaceae* when replum of the fruit is taken into consideration the group shows a striking resemblance to certain *Cruciferae*.'

So according to Airyshaw, *Cleomaceae* should be between *Capparaceae* and *Cruciferae*. Hutchinson (Gen. Fl. Pl. 2:305, 1967) also feels that the subfamily *Cleomoideae* with herbs and capsular fruits provided with replum are related to *Cruciferae* and should be given a family status, restricting the *Capparaceae* to the subfamily *Capparidoideae*. While this may become an established practice in future, for the present, I, however, retain the *Cleomaceae* under *Capparaceae* following the traditional treatment.

Cleome monophylla Linn. Sp. Pl. 672, 1753; Hk. f. & Thoms. in Hk. f. F.B.I. 1. 168, 1872; Raizada and Sharma in Ind. For. 88 (5):356, 1962; Kapur and Srivastava in Science & Culture 25:532, March 1960.

An erect branched herb upto 75 cm high. Leaves 2.5-5 cm, oblong lanceolate, puberulous, penninerved, base rounded or cordate; bracts peliolate. Flowers 1.2-2.5 cm long, dull purple; racemes elongating in fruit. Patels 4, long clawed. Samens 6. Capsule 5-10 cm, striate, sessile or shortly stalked. Seeds rugose.

Todagarh, Ajmer district, V.S. Sharma 1810. A weed in cultivated fields and waste places; Sohramau, Unao district, Kapur and Srivastava Herb. Nat. Bot. Garden No. 36187 & 36188, in Cultivated sandy field.

Fl. & Fr. Aug-Oct.

Distribution:-Western Peninsula from Chota Nagpur, Bihar and Orissa, Madhya Pradesh and the Konkan, Madras Pres.; Ceylon, Tropical Africa.

Crateva nurvala Buch.-Ham. Trans. Linn. Soc. 15:121, 1827; Kurz in Journ. Bot. 12:195, 1874; Koord. Atlas t. 795, 1918 ("*C. narvala*"); Jacobs Fl. Mal. 1, 6:68, f. 1, 2c, 4, 1960 (*C. nurvala* var. *nurvala*) et in Blumea 12(2): 194, 1964. *C. religiosa* var. *nurvala* (Buch.-Ham.) Hk. f. & Th. in Hook. f. F.B.I. 1: 172, 1872; Duthie Fl. UGP. 1: 52, 1903. *Nurvala* Rheede Hort. Malab. 3:49, t. 42, 1682. *C. lophosperma* Kurz, Journ. Bot. 12: 4-6, 1874; Merrill in Lingn. Sc. Journ. 5: 83, 1927; Kanjilal and Das Fl. Assam 1: 74, 1934; Raizada in Journ. Ind. Bot. Soc. 14 (4):342, 1935; Corner, Gard. Bull. St. Settl. 10:16, 1939 (*Crateva* "A"); P.C. Kanjilal For. Fl. Pilibhit, Oudh, Gorakhpur and Bundelkhand 20, 1933.

A tree 4-20 m high, (rarely a shrub 3.5 m), during anthesis in full foliage. Branchlets greyish-brown when dried. Petiole 3.5-11 (-14) cm, vigorous, with a distinct knob consisting of glands to about 1 mm. Leaflets on both the fertile and sterile shoots chartaceous to thinly coriaceous, 3-6 (-10) mm stalked, rarely sub sessile, about 2.3-4.4 (-4.9) times as long as wide, 8.75-17.5 (-28) by 1.5-6.5 cm, top gradually acuminate with an acute tip; mid-rib reddish tinged, nerves (7-) 10-15 (-22) pairs, distinct, prominent beneath, especially near their insertion; surface above glossy brown-greenish, underneath dull glaucous-greyish; inflorescence terminal on leafy twigs to about 12 cm, rhachis growing through for a time while producing flowers to about 100, eventually (3-) 10-25 cm long, covered with distinct scars left by the pedicles 4-7 cm long. Torus 3-5 mm diameter. Sepals 2-3.5 by 1.25-1.5 cm. Petals 5-12 mm, clawed, limb (8-) 15-30 by (5-) 15-22 mm. Stamens on androphore 1-2 mm, 15-25.

Gynophore 3.5-6.5 (-1) cm, ovary ellipsoid to cylindric about 5-6 by 2.5 mm, stigma flat sessile more or less distinct. In the male flowers the gynoeceium is shed. Fruit on gynophore 4-5 mm thick, ellipsoid, rarely (ob) ovoid or globose, 4.75-6.25 by 4-5.25 cm, pericarp 4-5 mm thick, (perhaps less when fully ripe) covered with a thin, dull, yellowish-greyish crust breaking into minute particles which seem to peel off sooner or later, leaving the surface smoothish; seeds 6-15 by 6-11 by 2-3 mm, dull dark brown, dorsally with a crest of sharp irregular protrusions.

Gorakpur, 11-4-1911, *A.E. Csmaston* Dehra Dun Herb. No. 2817; Tilkonia, Gorakhpur, March 1914, *P.C. Kanjilal* Dehra Dun Herb. No. 52566.

Fl. March-April.

Distribution:- Deccan Peninsula, mainly in the eastern and western Ghats, Bihar, Bengal, Assam, Burma, China, Indo-China, Siam, Sumatra, Malaya, Java, Borneo.

The above description has been taken verbatim from Jacob (*Blumea* 12 (2): 194, 1964) and fits in well with the specimens quoted above.

This tree is in cultivation in New Forest, (Forest Research Institute) Dehra Dun, *Raizada* Dehra Dun Herb. No. 65662.

Cratva unilocularis Buch.-Ham. Trans. Linn. Soc. 15: 121, 1827; Jacob in *Blumea* 12 (2): 193, 1964, Panigrahi et al in Bull. Bot. Surv. Ind. 11 (1 & 2): 105, 1969. *C. religiosa* (non Forst. f.) Merr. Lingn. Sc. J. 5: 83, 1927 "*C. roxburghii* R. Br." Kanjilal & Das Fl. Assam 1: 73, 1927.

Tree 5-12 (to 30 Kanjilal & Das) m tall, in full foliage during anthesis; branchlets grey-brownish. Petiole (3.75) 5.5-12 cm with distinct glands. Leaflets 4-12 mm stalked, thin-coriaceous, brownish-green when dried, faintly glossy above, slightly paler and dull underneath, lateral ones asymmetric, about 2-2.5 times as long as wide, (5-) 7-14 by (2.5-) 3-7 cm, with a short acute acumen, midrib reddish, nerves 5-10 pairs, reticulation distinct. Inflorescence terminal on leafy twigs to about 12 cm, not growing through after anthesis, rhachis about 3-6 cm (the flowering and leafy parts not much overlapping), bearing about 10-40 flowers; pedicels 3.5-7 cm. sometimes leaving a very distinct scar after anthesis. Torus 3-5 mm wide. Sepals 7-12 by 2.5-3 mm. Petals 7-18 mm, clawed, the limb 12-25 by (3-) 7-20 mm. Stamens 15-22, androphore about 5 mm. Gynophore 3.5-6.5 cm; ovary 3-4 by 1-2 mm, stigma subsessile, 1 mm, in the male flowers the gynoeceium reduced. Fruit on gynophore, 4-7 mm thick, globose 2.5-4 cm diameter, pericarp about 2 mm thick, rough with minute flat papillae, dull greyish brown when dried:

pulp orange; seeds smooth, 8-12 by 4-10 by 3-6 mm, dull brown.

Bhinga, Bahraich distr., *Panigrahi* 2753 (Not seen) Scarce.

Fl. & Fr. March.

Distribution:—Nepal near Pokhara, Darjeeling Terai, Bengal (Sukna and Jalpaiguri distrs.), Bangla Desh, Burma, China, Indo-China.

Panigrahi's specimens quoted above was not available for examination but I am certain that his species "*C. unilocularis*" can not be anything than *C. murvala* Buch.-Ham. (*C. lophosperma* Kz.) which occurs and has been collected from the adjoining area (Gorakhpur). Moreover from the distribution given above, *C. unilocularis* Buch.—Ham. has not so far been known to occur in the Upper Gangetic Plain. According to Jacob (loc. cit.) "*C. unilocularis* is so near *C. murvala* that for a time I considered to place it there as a variety; it is also near *C. religiosa* but the leaflets are longer stalked; firmer in texture, and not quite concolorous, the fruit globose, the inflorescence richer."

VIOLACEÆ

Viola canescens Wall. ex Roxb. in Fl. Ind. ed. Wall. & Carey 2: 450, 1824; Hk. f. & Th. in FBI. 1: 184, 1872, under *V. serpens*; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 179, 1968.

Softly densely pubescent herb. Stems none or very short, nearly always producing long leafy runners. Leaves tufted, ovate 2-5 cm, deeply cordate, crenate, stipules fringed. Flowers blue, irregular, 2-sexual, on axillary stalks usually solitary. Sepals 5, persistent, nearly equal. Petals 5, spreading, the lowest one the largest, its base produced in a hollow spur, the other 4 flat nearly equal; stamens 5, anthers sessile, erect, 2-celled, united in a ring encircling the ovary. Ovary sessile, 1-celled, style thickened upwards. Stigma terminal, truncate, not beaked, ovules several, disposed in 3 lines on the walls of the cavity. Capsule ovoid, opening horizontally by 3 boat-shaped valves.

Sahasradhara, Som Deva 1710; Kalinga Hill Som Deva 2057.

Fl. & Fr. April-Nov.

Distribution:—Hilly districts throughout India.

Viola pilosa Bl. Bijdr. 57, 1823; Backer & Bakh. f. Fl. Java 3: 644, 1968 (Addenda et corrigenda). *Viola serpens* Wall. in

Roxb. Fl. Ind. ed. Carey & Wall. 2: 449, 1824; Hk. f. & Th. in FBI. 1: 184, 1872 (excl. var. *canescens*, *glabra*, *confusa*), Collett, Fl. Siml. 40, 1902; Backer in Beih. Bot. Centralb. Abit. 2, 34: 255, 1916 et Bot. Jahrb. 40: 103, 1920.

Perennial stoloniferous herbs, with a stout woody rhizome. Leaves in a rosette, those on the stolons spirally arranged, on 5-9 cm long petioles, ovate-triangular, with a cordate and rounded lobes, crenate serrate, upto 3-6 (—10) × 2.5-4.5 (—6) cm. Flowers white or pale lilac, solitary on 0.5-0.8 cm long pedicels; sepals lanceolate-oblong, subacute-obtuse, 0.6-0.7 cm long; petals, 1-1.5 (—2) cm long, the lowest one often with bluish streaks, spur saccate, 0.25-0.3 cm long; style clavate, geniculate at base, 0.2-0.5 cm, long; stigma truncate.

Dehra Dun: Robber's Cave, C.R. Babu 3408, 35056, common in humid localities of ravines.

Fl. & Fr. March-Nov.

This species is very variable in size and shape of leaves, hairiness and size of flowers. It can readily be distinguished from its allied species *V. arcuata* Bl. (= *V. distans* Wall.) by long-dentate stipules and truncate apex of stigma. *V. canescens* Wall.—a species very similar to this, and, possibly may be only a variety of it, has been collected within the area, (See above) as it is very common in adjacent hills. It differs from *V. pilosa* Bl. (= *V. serpens* Wall.) in having fringed stipules and densely hispid-pubescent leaves. If *V. serpens* Wall and *V. canescens* Wall. are united, the correct name for the combined species should be *V. serpens* Wall. since Hooker. f. and Thomson (loc. cit.) were the first to unite these two species and adopted the epithet "*serpens*" for the species with *V. canescens* as a variety under it.

Specimens from this are referable to sub sp. *garhwatensis* Back.

POLYGALACEÆ

Polygala chinensis Linn. var. *linarifolia* (Willd.) Chodat in Mem. Soc. Phys. Hist. Nat. Geneve 31, 2: 381, 1893; Mukerjee in Bull. Bot. Soc. Beng. 12 (1 & 2): 40, 1958; *Polygala linarifolia* Willd. Sp. Pl. 3: 877, 1803; *P. linearifolia* DC. Prodr. 1: 326, 1824. *P. tranquebarica* Mart. in Denk. Bot. Gesell. Regensb. 1: 185, 1815; W. & A. Prodr. 1: 37, 1834. *P. depauperata* Wall. ex Benn. in Hk. f. FBI. 1: 206, 1872 pro synonym. *P. glomerata* Benn. in Hk. f. FBI. 1: 206, 1872 pro parte non Lour.

The variety has linear or narrowly lanceolate, 4-5 cm long, 5-10 mm broad, leaves pale beneath. Racemes short, leaf opposed, flowers pink.

Mohan Pass, Saharanpur Siwaliks *Raizada*, Dehra Dun Herb. No. 82239; Dehra Dun *Har Sukh* (Sept. 1900).

Fl. Sept.

Distribution: South & Central India, N. W. Himalaya to Assam, Burma. Also Pakistan (J. E. T. Aitchison dated 10.9.1871, Rawalpindi in Herb. Dehra Dun); Guzerat & Scind Herb. Dalzell specimen marked 1,2,3 specimen No. 4 on this sheet is *P. erioptera* DC.

Polygala furcata Royle Ill. t. 19. B., 1834; Som Deva in Bull. Bot. Surv. India. 10 (2): 179, 1968; *Semeiocardium hyalinum* Craib in Notes Roy. Bot. Gard. Edin. 11: 188, 1919; Mukerjee in Bull. Bot. Soc. Beng. 12: 34, 1960. *Polygala triphylla* Ham. in Don Prodr. 200, 1825 (non Burm. f.) var. *glaucescens* Benn. in Hk. f. Fl. Brit. Ind. 1: 210. 1872. excl. *syn.*

An erect, annual, glabrous herb, about 5-10 cm high. Stem naked in the major portion, leafy in the terminal portion only. Leaves petiolate, broadly lanceolate. Flowers yellow in terminal racemes; capsule suborbicular, winged. Seeds pubescent, tubercled.

Sahasradhara, *Raizada* on moist rocks; *Som Deva* 1102, on moist rocks in shady situation.

Fl. & Fr. Late July-Sept.

Distribution:—N.W. Himalaya, Nepal, Chota Nagpur, Orissa, Assam, Burma.

Polygala irregularis Boiss. Diagn. Ser. 1, fasc. 1:8, 1842; Fl. Orient. 1: 469, 1867; Oliver in Fl. Trop. Afr. 1: 131, 1868; Chodat in Mem. Soc. Phys. Hist. Nat. Geneve, 31 (2 No. 2): 392, 1893. Cooke Fl. Bomb. Pres. 1: 61, 1901; Blatt. & Hallb. in Journ. Bom. Nat. Hist. Soc. 26: 223, 1918; Parsa Fl. Iran 1: 972, 1951; Cufodontis, Bull. Jard. Bot. Bruxells 26: 3: Suppl. 408, 1956; Raizada & Sharma in Ind. For. 88 (5): 356, 1962; Mukerjee in Bull. Bot. Soc. Beng. 12 (1 & 2): 42, 1958; Iqbal Dar in Fl. West Pakistan 52: 10, 1973.

A perennial herb with usually spreading or widely ascending, 15-40 cm long elongate branches from a slightly woody base. Root often as long as the branches. Branchlets adpressedly pubescent, terete, striate, the older with conspicuous projecting cicatrices of fallen leaves. Leaves very variable in shape and size, 0.5-4 × 2-6 cm, somewhat leathery, obovate-oblong, oblanceolate or narrowly elliptical, the lower usually smaller and obovate, apex obtuse, apiculate, retuse-apiculate, at base alternate to a very short hairy petiole, rarely exceeding 2 mm, in length, margins entire, often deflexed; surfaces inconspicuously puberulous, mid-vein inconspicuous, impressed above, prominent

beneath. Flowers secund, in terminal generally divaricately elongate racemes 5-15 cm, long, (rarely as short as 1 cm), pedicels 1-3 mm long, hairy, narrowed at the base, often half deflexed; bracts caducous very minute, scarious, acute, minutely ciliolate, two laterals slightly smaller than the ovate oblong basal which is also more strongly-keeled, the raised cicatrices left by flowers conspicuous. Outer sepals much smaller than the wing-sepals, about 2 mm long, broadly-oblong to nearly oval, margins minutely ciliolate, wing-sepals petaloid, obliquely ovate, scarious, entire or sometimes very minutely ciliolate, glabrous throughout or sometimes inconspicuously hairy along veins; the veins conspicuously green or purplish (Blatt. & Hallb.), diverging from the gibbous base, branches more or less reticulately above, with the ultimate veinlets not reaching the margins. Corolla purple; lateral petal about 4 mm long, obovate, cuneate, at top somewhat truncate and with obscurely undulate margins, densely ciliate at base. Capsule very oblique, deeply notched, 6-7 mm in length at the broadest, pale-green, glabrous, broadly winged, the wings gradually narrowed down wards and with the close transverse bifurcating veins, the appressed wings in mature capsule nearly as long as or slightly longer than the capsule but much shorter in breadth. Seeds 3-4 mm long, conical, velvety, the hairs short, dirty-brown; testa under the hairy coat black, at the pointed apical region the hairs rather close and appressed, at the distal end crowded by a conspicuous ring of long hairs; strophiole absent, the two V-forming aculiform pendant appendages of greyish colour present.

Pushkar, Ajmer distr., *V.S. Sharma* 737; Below Pushkar Ghati *V.S. Sharma* 1172. Ladrin, Rajasthan, *S.K. Tandon* Dehra Dun Harb. No. 118984.

This species has not been mentioned in Hk. f. Fl. Br. Ind., Cooke included it with the remark 'a rare plant in Sindh and coast of Kathiawar,' but around Ajmer the species is frequent on sand dunes and open gravelly ground.

This species can be readily distinguished from the rest of the Indian Polygalas by its characteristic conical seed having a conspicuous ring of long hairs at the broader end below the distal papillar-zone.

Fl. & Fr. Sept.-Nov.

Distribution :—Arabia, W. Pakistan, Iran, India.

Salomonias catoniensis Lour. Fl. Cochinch. 1: 14, 1790; Bennett in Hk. f. FBI. 1: 206, 1872; Raizada & Saxena in Ind. For. 88 (9): 702, 1962.

A small herb, 3-10 cm high with winged stem. Leaves shortly petiolate, ovate-cordate, 3-10 mm, entire, shortly

mucronate. Flowers minute, in terminal, lax spikes. Petals pink, united at the base with the staminal sheath. Style filiform, enclosed in the staminal sheath. Capsule much compressed laterally, 2-celled, loculicidal, toothed on the margins with minute triangular often recurved teeth.

Rajpur, Dehra Dun, gregarious on moist shady slopes in 'Sal' forest, Saxena 2195, 2302.

Distribution :—Bengal, Assam, Khasi Hills, upto 1200 m, Eastern Peninsula, Malaya Archipelago, Siam-S.E. Asia.

Salomonina ciliata (L.) DC. Prodr. 1: 334, 1824; Raizada & Saxena in Ind. For 88 (9): 702, 1962; Merr. in Philip. Journ. Sci. (Bot.) 7:237, 1912 et Enum. Philip. Flow. Pl. 2: 386, 1923. *Polygala ciliata* Linn. Sp. Pl. 705, 1753. *Salomonina oblongifolia* DC. Prodr. 1: 334, 1824; Bennett in Hk. f. FBI. 1:207 1872; Craib Fl. Siam. Enum. 1: 99, 1925.

A herb 5-8 cm, high with winged stem, often tinged with reddish- purple, 15-5 cm tall. Leaves sessile or subsessile elliptic or ovate-lanceolate, entire, mucronate. Flowers pink, very small, in dense terminal spikes. Capsule 2-celled, margins toothed with filiform teeth.

Chir Forest (Plantation) Rajpur, Dehra Dun Raizada. s. n. Rajpur on open grassy slopes near 'Sal' forest, rare. Saxena 2329.

Fl. & Fr. Late Sept.-Oct.

Distribution:- So far known from subtropical Himalaya from Nepal and Sikkim, Khasi Hills, Eastern and Western-Peninsula; Ceylon, Japan, Indo-China, Malaya, Australia.

FRANKENIACEÆ

Frankenia pulverulenta Linn. Sp. Pl. 332, 1753; Edgeworth in Hk. f. FBI. 1: 212, 1872; Raizada in Proc. Nat. Ins. Sc. Ind. 24: 200, 1958.

A slender annual much branched prostrate herb. Leaves very shortly petioled, obovate, retuse. Flowers pink, shorter than leaves. Calyx cylindrical, strongly ribbed. Petals small.

Sahibabad, Daulatpur, Delhi, Raizada Dehra Dun Herb. No. 113649; Delhi, Harbhajan Singh Dehra Dun Herb. No. 115559.

Fl. Feb. Fr. March-April.

Distribution:- Plains of the Punjab and Sindh. South Europe, Senegal and South Africa.

Although this species has not been recorded by Kashyap & Joshi in their 'Flora of Lahore district,' it was collected by Dr. J.L. Stewart from Lahore as early as April, 1864 (Stewart 2900 in Herb. Dehra Dun.)

CARYOPHYLLACEÆ

Cerastium cerastioides (Linn.) Britton in Mem. Torr. Bot. Club 5: 150, 1894; Gartner in Fedde Repert. (Beih.) 113, 1939. *Stellaria cerastioides* Linn. Sp. Pl. 604, 1753 *Cerastium glomeratum* Thuill. Fl. Par. ed. 2, 226, 1799. *Cerastium trigynum* Vill. Pl. Dauph. 3: 645, 1789; Edgew. & Hk. f. in FBI. 1: 228, 1874.

An (annual?) or perennial densely pubescent herb. Leaves linear-oblong, ciliate, obtuse, Flowers white, cymes at first subcapitate, fruiting pedicels subterect, shorter than sepals, bracts all herbaceous; sepals acute, 0.4 cm long, densely hairy, margin narrowly membranous. Petals obcordate, deeply emarginate or 2-lobed; stamen 8-10; capsule 0.8-0.9 (-1) cm, long, much exceeding the calyx, often curved. Seeds tuberculate, ellipsoid 0.1×0.08 cm.

Sumera, Aligarh distr. *Husain* 441, 457; Hardwaganj (Atrauli Road) *Husain* 238, 242; Below Rajpur, *Som Deva* 2197; Rispana, Dehra Dun, *C. R. Babu* 35087.

Fl. & Fr. Feb. Nov.

Distribution:- Throughout the temperate and subalpine regions of India and Ceylon-Temperate N. Europe, South Asia; also introduced in various countries.

Drymaria cordata (Linn.) Willd. ex R. & S. Syst. Veg. 5: 406, 1819, subsp. *diandra* (Bl.) Duke in Ann. Miss. Bot. Gard. 48: 251, 1961; Mizushima in Journ. Jap. Bot. 38: 150, 1963. *D. diandra* Bl. Bijdr. 62, 1825; Mizushima loc. cit. 32: 69, 1957. *D. cordata* sensu Edgew. & Hk. f. FBI. 1: 244, 1874 (excl. syn. *Cerastium cordifolium* Roxb.); Duthie Fl. UGP. 1: 67, 1903 (excl. syn. *C. cordifolium* Roxb.)

A prostrate or decumbent, glabrous annual; stems rooting at the base, trailing or straggling upwards. Leaves broadly ovate-orbicular, with a rounded-subcordate base, apiculate, 0.8-3 cm long, 0.5-2.5 cm broad; stipules lacerate into linear-subulate segments. Flowers greenish-white, in lax glandular-puberulous, repeatedly forked cymes, bracts 0.15-0.2 cm long, pedicels glandular-puberulous, 0.2-0.3 or even upto 0.8 cm long. Sepals obovate-oblong, glandular-puberulous on the prominent keel, with incurved apiculate tips, 0.25-4 cm long. Petals shorter than calyx, spathulate, deeply bifid, lobes oblong, obtuse. Stamens usually 3; style

2-3-fid near to the base. Capsule 3-gonous, 2-3 seeded; seeds reddish-brown, cochleate, 0.12-0.13 cm long by 0.11 cm.

Robber's Cave in moist shady places *Raizada*, also occurs as a weed in gardens.

Fl. & Fr. Greater part of the year.

It differs from subsp. *cordata* (which is a pantropical weed but not found in India), by pyriform flowers, apically incurved, densely glandular, carinate sepals, more stamens and more and larger seeds.

Mizushima (Journ. Jap. Bot. 32: 69, 1957) reinstated *D. diandra* Bl., a forgotten and long lost synonym of *D. cordata* (Linn.) Willd. ex R. & S., as a distinct species. However Duke (Ann. Miss. Bot. Gard. 48: 251 1961) reduced it to a subspecies of the later, as he found intermediates that connected *D. diandra* Bl. with *D. cordata*. This view was accepted by Mizushima in his subsequent work (loc. cit. 1963).

Sagina apetala Arduino Animadv. Bot. Sp. 2: 22, t. 8, f. 1, 1763-64; Mizushima in Journ. Jap. Bot. 35: 107, 1960; *Raizada* in Journ. Ind. Bot. Soc. 4 (4): 342, 1935.

A slender, almost filiform wiry annual about 6 cm high. Stem ascending not rooting. Leaves opposite subulate cornate at the base, filiform, upto 2 cm long, spreading. Flowers solitary small, on capillary pedicels, green, 4-merous. Sepals 4, free. Petals none (or very minute); stamens 4 opposite the sepals and alternating with 4 very minute staminodes; ovary 1-celled, styles 4-5, minute; ovules many. Capsule ovoid-ellipsoid, 4-5-valved to the base. Seeds brown, smooth-rugose.

Dehra Dun, *Parker*, *Raizada*. A garden weed of damp places.

Fl. & Fr. Cold Season.

Distribution:—Europe, Northwards to Denmark and South-Sweden, N. Africa, West Asia, South America.

Silene alba (Mill.) Krause in Sturm, Fl. Deutschl. ed. 2, 5: 98, 1901; Chowdhry in Notes Roy. Bot. Gard. Edin. 22 (3): 221-278, 1957; Nair in Bull. Bot. Surv. Ind. 11 (1 & 2): 201, 1969. *Lychnis alba* Miller Gard. Dict. ed. 8, 1768; Butcher, New Ill. Brit. Fl. 1: 414, f. 301, 1961. *Melandrium album* (Mill.) Garcke. Fl. Deutschl. ed. 4, 55, 1858; Stella Ross-Craig Drawing Brit. Pl. part 5, Pl. 15, 1951.

An erect perennial herb upto 40 cm tall, branching from the base. Stem, leaves and calyx hairy; hairs of 2 types—soft spreading simple hairs and gland-tipped hairs. Lower leaves elliptic or lanceolate, acute, margins wavy, 10-17 × 1-3 cm,

lamina gradually narrowed into a petiole; leaf base stem clasping; upper leaves linear-lanceolate or elliptic, sessile. Flowers dioecious or rarely monoecious, in a few-flowered terminal dichasium. Pedicels upto 1.5 cm, long. Calyx upto 17 mm long, with 5 lanceolate teeth, cylindrical, constricted above and 10-veined in staminate flowers and ovoid and upto 20 veined in pistillate flowers. Petals white, limb obovate, bifid half way down, upto 8 mm long; coronal ligules 2, fringed at the apex; claw exerted, upto 2 cm long, auricled at top. Stamens 10; styles 5. Ovary almost cylindric 7×4 mm, unilocular, green, ovules many on central placenta; capsule opening at the top by 10 sub-erect teeth. Seeds 1.25-1.5 mm across, bluntly tubercled.

Canal bank on Raipur Road, Dehra Dun, V.J. Nair 37672.

Fl. & Fr. July-Aug.

Distribution:—Europe, North Africa, Siberia & Western Asia. It is a common weed throughout British Isles.

Spergula fallax (Lowe) Krause in Sturm, Fl. Deutsch. (ed. 2.) 2: 19, 1901; Milne-Redhead in Kew Bull. 1950: 338, 1950; Burt and Lewis in Kew Bull. 1952: 349, 1952. *Spergularia fallax* Lowe in Hook. f. Kew Journ. Bot. 8: 289, 1856; Babu in Bull. Bot. Sur. Ind. 9 (1-4): 277, 1967. *Arenaria flaccida* Roxb. Fl. Ind. 3: 447, 1832 (non Clairv. 1811). *Spergula pentandra* Linn. var. *intermedia* Boiss. Diagn. Ser. 2, 1: 93, 1853 et Fl. Orient. 1: 731, 1867. *Spergularia flaccida* (Roxb.) Aschers. in Verh. Bot. Ver. Brand. 30: 153, 1889. *Spergula pentandra* sensu Edgew. & Hk. f. in Fl. Brit. Ind. 1: 243, 1874 pro parte (non Linn. 1753); Duthie, Fl. UGP. 1: 67, 1903.

A prostrate or decumbent-ascending, annual herb. Stems often branched from base. Leaves linear, flat, obtuse 1.5-3 (3.5) × 0.4-0.8 (-0.1) cm; stipules ovate, acute. Flowers greenish-white, in lax terminal cymes; pedicels 0.3-1 cm long; sepals ovate subobtusate, scarious margined, 0.35-0.4 cm; petals ovate-oblong subobtusate, entire, 0.2-0.22 cm long; stamens 8; ovary of 3 carpels, styles 3. Capsule ovoid-subglobose, 3-valved, 0.4-0.5 cm long, seeds compressed, black, polished, granulate, winged, 0.1-0.12 cm across (inc. wing), striate, 0.15-0.2 cm across.

Dehra Dun, C.R. Babu 33858; common in agricultural fields, waste places, gardens and road-sides; Saharanpur Gamble 24479 (Cal.) (as *S. pentandra* Linn.) Kanpur without collectors' name 14899 (Cal.) (as *S. arvensis* L.) Chatter Manzil, Lucknow, H.B. Naithani Dehra Dun Herb. No. 149382; Mathura, D.C. Joshi Dehra Dun Herb. No. 148060.

This species is very closely allied to *S. arvensis* Linn. and *S. pentandra* Linn. and in fact mixed with them in the herbaria of Calcutta, (Cal.) Dehra Dun (DD) and Botanical Survey Northern Circle, Dehra Dun (BSD) but these specimens can be distinguished by the following key:

1. Seeds subglobose, keeled or narrowly winged, granulate; capsule 5-valved, styles 5. Leaves channelled beneath.

S. arvensis

1. Seeds compressed, broadly winged, smooth or faintly granulate; capsule 3-or 5-valved. Leaves not channelled beneath

2. Styles 3. Capsule 3-valved. Petals sub-obtuse.

S. fallax

2. Styles 5. Capsule 5-valved. Petals acute.

S. pentandra

A critical study of the Indian material of the genus *Spergularia* Linn. shows that the specimens hitherto identified as *S. pentandra* Linn. either belong to *S. fallax* (Lowe) Krause or *S. arvensis* Linn. This indicates that the true *S. pentandra* Linn. may not be found in India. It is equally interesting to note that almost all specimens identified as *S. arvensis* Linn. from N.W. & Central India (Northern India) are *S. fallax*. This shows that *S. arvensis* Linn. may be found only in southern and eastern parts of India, and does not occur in Northern India, where it is replaced by *S. fallax*, the distribution of which ranges from N. India to Madeira and Canary Islands. A solitary specimen Sanyal 540 (Cal.) of *S. fallax* from Ramsagar in W. Bengal shows its gradual migration to Eastern India, and may soon diffuse into S. India, from where it has not been reported so far.

I have seen no specimens of *S. arvensis* Linn. from the area of the Upper Gangetic Plain.

Distribution :—Madeira and Canary Islands, N. Africa, Egypt Arabia, S. Persia, Afghanistan, Baluchistan, North and Central India.

Stellaria alsine Grimm. in Nov. Act. Leop. 3, app: 313, 1767, var. (*undulata* Thunb.) Ohwi in Act. Phytotax. Geobot. 10: 136, 1941; Kitamura, Fl. and Faun. Nep. Himalaya, 124, 1953; Mizushima in Journ Jap. Bot. 40: 250, 1965; *S. undulata* Thunb. Fl. Jap. 185, 1794. *S. uliginosa* auct. non Murr. 1764, Edgew & Hook. f. in FBI. 1: 233, 1874.

An annual or perennial herb with a creeping root stock and numerous decumbent and ascending smoothly 4-angled glabrous

shoots, 10-40 cm long. Leaves about 5-10 mm, sessile, elliptic or oblanceolate, acute, slightly ciliate at the base, otherwise glabrous. Flowers greenish-white, 3 cm long, about 6 mm across, in terminal few flowered racemes. Bracts scarious .15-2 cm long, with a green central stripe; pedicel upto 1.5 cm long, glabrous. Calyx funnelshaped at the base; sepals 2.5-3.5 mm, glabrous, lanceolate, acute, 3-veined. Petals 17-.25 cm long, white or absent, shorter than the sepals, bifid almost to the base, with widely divergent lobes. Stamens 3-5. Capsule equalling the calyx, ovoid, narrowed below and with a short carpophore. Fruit stalked .5-3 cm, at first reflexed, then erect. Seeds .3-.4 mm across, pale reddish-brown, with small tubercles.

Rispana, Sandwanwali, Dehra Dun C.R. Babu 35009.

Fl. & Fr. Feb.-May.

Mizushima (loc. cit. et Fl. East Himalaya 82, 1966) referred the East Asiatic plants to this variety, distinguished from the European variety *alsine* by fewer stamens and flowers with petals.

Stellaria webbia (Benth.) Edgew. & Hk. f. in Hk. f. FBI. 1 : 220, 1874; S. K. Malhotra in Maharashtra Vindyan Mandir, Patrika 6(1) : 39, 1971. *Leucostemma webbia* Benth. in Wall. Cat. 642, 1813 and in Royle, 111. Bot. Himal. 81, t. 21, f. 2, 1834.

A glabrous decumbent herb; leaves sessile, linear or acicular, $9-17 \times 1-1.5$ mm. Flowers axillary, long peduncled. Sepals lanceolate, acuminate, much shorter than the 2-fid petals. Petals white, 2-fid to about the middle. Capsule equalling the sepals, ovoid, 6-valved.

Sahasradhara, growing along the slopes, S.K. Malhotra 27627.

Fl. & Fr. April-May.

Distribution :—Western temperate Himalaya from Kumaon to Sirmur.

Malhotra's specimen quoted above is definitely from a much higher elevation and I am quite clear in my mind that the place does not fall within the area of this flora. I have collected this species from Jabbarkhet, Mussoorie and I have seen specimens in Herb. Dehra Dun collected by R.R. Stewart (1493) and by Duthie (1389) from Jabbarkhet, Mussoorie.

Stellaria monosperma Ham. ex D. Don. var *paniculata* (Edgew.) Majumdar in Journ. Ind. Bot. Soc. 44 : 144, 1965. *Stellaria paniculata* Edgew. in Trans. Linn. Soc. 20 : 35, 1844 et in Hk. f. FBI. 1 : 229, 1874; Som Deva in Bull. Bot. Surv. Ind. 10(2) : 179, 1968.

A decumbent or suberect herb, 0.5-1.3 m high. Leaves ovate-lanceolate or broadly lanceolate, 4-10 × 1.7-4 cm, acuminate; lower ones with cuneately winged petiole, upper petioled or nearly sessile. Flowers in terminal or axillary hairy-flowered panicles. Petals white, shorter than the sepals. Styles 3.

Dehra Dun district: near Rajpur, *Som Deva* 2962.

Fl. & Fr. July-Sept.

Distribution :—W. Himalaya 2,100-2,700 m, Sikkim, Khasia Mts., Nilgiri Hills.

PORTULACACEÆ

Portulaca parvula A. Gray in Proc. Am. Acad. 22 : 274, 1887; Gleason in New Britton & Brown Illustr. Fl. North-Eastern United States and adjacent Canada 2 : 114, 1952; Murty & Singh in Proc. Nat. Inst. Sc. Ind. 27(1) : 14, 1961.

An annual, spreading or ascending; roots tapering; stems much branched from the base, 5-16 cm long, bearing tufts of light-coloured long hairs in the axils of leaves and partly clothing the internodes. Leaves fleshy, linear, flat and nearly terete. Older leaves deciduous, lower alternate, and uppermost clustered at the ends of branches, forming an involucre of 5-10 leaves mingled with long hairs. Flowers solitary terminal or 3-4 together within involucre of 8-10 leaves, 1 cm, across, pink; stamens numerous (10-12); style branches 4-5-fid. Seeds with minute tubercles, blackish.

Rispana, Dehra Dun, *C.R. Babu*, 33411.

Pandav Block, Hastinapur, *Murty & Singh* 154. Dehra Dun *Raizada*.

Fl. July-Oct.

Portulaca pilosa Linn. ssp. *grandiflora* (Hook.) Geensink in Blumea 17 : 297, 1969 et Fl. Males. (Ser. 1) 7(1) : 139, 1971. *Portulaca grandiflora* Hk. in Bot. Mag. n.s. 3 : t. 2885, 1828 (Feb.); Cambess. in Fl. Brasil Merid. 2 : 192, 1829; Bailey, Man. Cult. Pl. ed. 2, 365, 1949; Backer & Bakh. f. Fl. Java 1 : 216, 1963.

A succulent, prostrate or ascending, glabrous herb. Branches many from the base. Leaves linear-lanceolate, borne all round the stem, very shortly petiolate, suberect. Flowers rose-purple or deep pink, red, orange or yellow in terminal, sessile clusters. Sepals 2, broad ovate. Petals 5, spreading, fan-shaped, notched. Stamens 40-75; anthers yellow; filaments purple. Style solitary, broader above. Stigmas 4, coiled or decurved. Seeds reniform, tubercled, black.

Common on the Ridge at Delhi during the monsoon, spreading upon stones or growing under the shade of bushes. *J.K. Maheshwari* 1245. The flowers are attractive and the plant is grown as a pot herb and is cultivated as a garden-ornamental.

Fl. & Fr. Aug.-Oct.

Native of Brazil (tropical America), cultivated as an ornamental.

Portulaca pilosa Linn. ssp. ***pilosa*** Geensink in *Bluméa* 17 : 297, 1959 et *Fl. Males.* (Ser. 1) 7(1) : 131, 1971. *Portulaca tuberosa* Roxb. (*Hort. Beng.* 91, 1814, nom. nud.) *Fl. Ind.* 2 : 464, 1832; *Dyer* in *Hk.f. FBI.* 1:247, 1872; *Raizada & Sharma*, in *Ind. For.* 88(5): 359, 1962; *Backer & Bakh. f. Fl. Java* 1 : 216, 1963 (*race tuberosa*).

A tuberous rooted perennial herb with fusiform root; stem spreading. Leaves alternate, fleshy, linear; nodal appendages of 1 cm of sparingly tufted brown hairs. Flowers yellow or pink, in small terminal clusters, surrounded by about 8 leaves and tufted hairs; petals 2.5-12×1.8-11 mm, 4-6, obovate; stamens 20, indefinite; style filiform, 3-7-cleft. Seeds dull black or bluish or grey granular.

Ajmer : Foot of Madar Mt., opposite C.R.P. Quarters, *V.S. Sharma* 288, rare and restricted to sandy areas; Bahla Badla Road (side nalla), *V.S. Sharma* 1001, in gravelley rocky soil; Mawa bir Forest, Ajmer, *A.E. Lowrie* (25.7.1886); Makhdoompur, Unao district, *P.C. Kinjilal* Dehra Dun Herb. No. 96816.

Fl. & Fr. July-Oct.

Distribution :—Bihar, Sindh, Western Peninsula, Ceylon, Malesia; infact Pantropical except Australia.

Talinum paniculatum (N.J. Jacq.) Gaertn. *Fruct et Sem.* 2 : 219, t. 128, 1791, Poellnitz in *Fedde Report.* 35 : 10-12, 1935; *Raizada* in *Journ. Ind. Bot. Soc.* 14(4) : 342, 1935; *A.C. Smith*, *Bull. Torr. Bot. Club* 70 : 537, 1943; *Green Wood* in *Journ. Arn. Arb.* 30 : 75, 1949; *Backer & Bakh. f.* in *Fl. Java* 1:217, 1963; *Geesink* in *Fl. Males.* (Ser. 1) 7 (1) : 124-125, 1971. *Portulaca paniculatum* Jacq. *Enum. Pl. Carib.* 22, 1760. *P. patens* Linn. *Mant.* 2 : 242, 1771. *Talinum patens* (Linn.) Willd. *Sp. Pl.* 2 : 863, 1799; *Craib*, *Fl. Siam. Enum.* 1 : 110, 1925; *Merr. & Chun* in *Sunyatsenia* 1 : 56, 1934.

A glabrous, erect succulent, somewhat shrubby herb. Stem upto 36 cm high, leafy to the middle from where the panicle begins. Leaves sessile, mostly subopposite, exstipulate, oval,

abruptly tapering towards the petioliform base, 2-5 cm long. Panicle terminal, long, leafless bearing dichotomous cymes. Flowers carmine or pinkish. Sepals 2, distinct 0.1-0.2 cm long, caducous, purplish. Petals 5, upto 0.25 cm, rosy, ephemeral; stamens about 5-12 (15-20); ovary free; fruit a 3-valved capsule, yellow or pink, globose, slightly 3-gonous, 0.5 cm across; seeds black, minutely striolate.

Dehra Dun, Self sown *Parker*; *Raizada*, cultivated as an ornamental, also met with as an escape in waste places.

Fl. April-May. *Fr.* June, July.

Distribution :—Indigenous to West Indies and east coast of South America to Buenos Ayres, now a pantropic weed.

ELATINACEÆ

Bergia polyantha Sond. in *Linnaea* 23 : 16, 1850; Oliver, *Fl. Trop. Africa* 1 : 153-A, 1868; *Raizada* and *Chatt.* in *Sc. & Culture* 27 : 302-303, 1961.

A diffuse, much branched, glabrous, annual herb 7.6-20.3 cm, lateral branches often procumbent. Leaves slightly fleshy, oval-oblong, acute, the lower cuneate at base, denticulate, at least towards the apex, 8.4 mm-2.54 cm long, 4.2-8.4 mm broad. Stipules of about 8 verticillately arranged lobes, shortly connate at base, lobes persistent, membranous, erect, narrowly triangular, acuminate, those of the lower leaves entire, of the upper serrate or ciliate. Flowers solitary in pairs, on slender pedicels, pedicels, exceeding or equalling the subtending leaf, about 6.3 mm across, thin, expanded. Sepals free, lanceolate or ovate-lanceolate, very acute, nearly equalling or sometimes exceeding the petals; petals as many as sepals and alternate with them, ovate-acute, rose-coloured. Stamens 10, hypogynous, filaments subulate, free; ovary free, globose or ovoid, 5-celled; styles free, very short, recurved; stigmas capitate; capsule with 5 longitudinal furrows, 5-valved, many seeded; seeds minute, oblong with rounded ends, faintly curved with strong scaliform reticulation.

Ajmer, *V.S. Sharma* 743.

A winter annual in damp situations; green when young, later tinged with purple.

Fl. & Fr. Nov.-Feb.

Distribution :—Africa and Australia.

This species had not been previously collected or reported from India and is not mentioned in any of the Indian floras.

HYPERICACEÆ

Hypericum japonicum Thunb. ex Murr. Syst. Veg., ed. 14: 702, 1784 (July); Thunb. Fl. Jap. 295, t. 31, Aug. 1784; Royle, III. Bot. Himal. 131, t. 24, f. 2, 1834; Dyer, in Hk.f. FBI.1 : 256, 1874; Backer & Bakh. f. Fl. Java 1 : 382, 1963; Janardhan and Uniyal in Curr. Sc. 42(13) : 478, 1973; Robson in Blumea 20(2):267, 1972 et in Fl. Males. (Ser. 1) 8(1) : 27-29, 1974.

An elegant annual herb, 25.-38 cm high, tufted or prostrate, glabrous, 4-angled. Leaves sessile, 1.2 cm or less, stem clasping, oval or obovate mucronate, pellucid-punctate, 5-7-nerved. Flowers about 8 mm across, yellow. Bracts and sepals linear-lanceolate, entire, acute, glandular and pellucid punctate at the apex. Sepals outer broadly elliptic and obovate, often elliptic; petals 5, bright yellow, equalling the calyx, persistent. Stamens connate at the base, hairy, 1-celled. Style 1 the length of ovary. Capsule about 4 mm. Seeds ribbed and transversely striate.

Dhikala, Corbett National Park, alt. 385 m *P.C. Pant* 43704, scarce, in moist open situation in the vicinity of the stream near Dhikala Forest Rest House.

Fl. April.

N.K.B. Robson in Fl. Males. (Ser. 1) 8(1) : 29, 1974, points out that "if *H. chinense* Osbeck, (Dagbok Ostind Resa 244, 1957) is a *Hypericum*, as seems likely, then it is almost certainly an earlier name for *H. japonicum* Thunb. ex Murray. In the absence of a specimen, however and in the interest of nomenclatural stability, it should be regarded as a "*nomen dubium*".

H. chinense Osbeck (1757) predates *H. chinense* Linn. (1759) as Merrill (Am. Journ. Bot. 3 : 588, 1916) pointed out. Merrill, however, thought that Linnaeus and Osbeck had described the same species, whereas Osbeck's description is of a herb with quadrangular stems, and hence his name cannot be applied to the Linnaean species.

Distribution :—Temperate and subtropical Himalaya from Garhwal to Sikkim, Khasi Mts., Assam, Bangladesh, Burma; Eastern and Western Peninsula and Ceylon, Australia, Japan, China, Malasia.

Hypericum oblongifolium Choisy Prodr. Hyper. 42, t. 4, 1821, et in DC Prodr. 1 : 545, 1824. non sensu Wall. Num. List No. 4810, 1831. N.K.B. Robson in K.H. Rech., Fl. Iran 49:4, 1968; in Journ. R.H.S. 95 : 489, 1970 et Fl. W. Pakistan 32:3, 1973. *H. cernuum* Roxb. (Hort. Beng. 59, 1814 nom. nud.) ex D. Don, Prodr. Fl. Nep. 218, 1885, Fl. Ind. iii: 400, 1832;

Dyer in Hk. f. FBI. 1 : 253, 1874; Raizada in Journ. Ind. Bot. Soc. 14(4) : 343, 1935. *H. aitchisonii* J.B. Drummond ex R. Keller in Engl. and Prant. Pflanzenfam. (ed. 2), 21:176, 1925, nomen.

An erect glabrous shrub; branches terete. Leaves 2.5-7 cm, sessile, minutely dotted. Flowers about 1.5 cm in diameter, bright golden yellow, in short terminal cymes. Petals obovate, longer than stamens; styles twice the length of the ovary; capsule conical.

Dehra Dun on rocky cliffs, *Raizada*, Robber's Cave C.R. Babu 33895 on ravine slopes.

Fl. April-May.

Distribution :—Western temperate Himalaya from Kurram to Nepal upto 1600 m.

ACTINIDIACEÆ

Actinidia callosa Lindl. Nat. Syst. ed. 2, 439, 1835 var. *callosa* Li, in Journ. Arn. Arb. 33: 47, 1952; Dyer in Hk. f. FBI. 1 : 286, 1874; Raizada in Journ. Ind. Bot. Soc. 14 (4): 343, 1935; Osmaston Fl. Kumaon 43, 1972.

A sub-deciduous climbing shrub. Leaves 9-14 cm long, membranous, acuminate. Flowers white in pedunculate, axillary 1-7-flowered cymes. Petals 5; stamens numerous. Ovary many celled. Fruit a fleshy, ovoid berry, 2 cm long, edible.

Bindal Nala, Dehradun, *Raizada* rather scarce, Dehradun, *Shaukat Hussain* Dehra Dun Herb. No. 22929.

Fl. June Fr. Sept.-Nov.

Distribution :—Temperate Himalaya from Garhwal and Bhutan to Khasi Hills-Manchuria, Japan.

MALVACEÆ

Abelmoschus tuberculatus Pal et Singh in Bot. Gaz. 113: 458-464, 1952, figs. 1-7.

Annual herbaceous shrub 0.5-1 m high in the wild state and 1.5-1.75 m under cultivation. Stem terete, strigose, green with light-purple irregular patches; internodes short; branches ascending. Leaves alternate, petiolate 12.5-15.5 cm long, strigose upper surface purplish; stipules linear, about 8 mm long, lower and middle leaves palmately-partite, lamina broadly cordate, 5-7-lobed, 10-12 cm long and 16.18 cm broad, lobes broadly ovate with 2-3 lobules in each, central lobe about 7 cm long and as broad, primary veins 6-7, uniformly diverging from the tip of the petiole, apices of lobes obtuse, margin crenulate, base deeply

rounded, both surfaces hispid, upper leaves palmatisect, 3-5-lobed, lamina broadly ovate, about 6.5 cm long and 8.5 cm broad, lobes broadly lanceolate, central lobe about 8 cm long and 2 cm broad, primary veins 3-5, apex acute, margin denticulate, both surfaces distinctly hispid, base truncate. *Inflorescence* a raceme, 30-40 cm long; flowers about 3.6 cm in diameter. *Epicalyx* of 9-12 subequal bracteoles; bracteole 1 cm long, linear, hairy, caducous. *Sepals* 5, spathaceous, circumscissile, splitting down to one side when the flower opens and falling off as one piece after anthesis; calyx tube 2.5 cm long and 1.2 cm in diameter. *Petals* 5, free, regular, obovate, generally yellow, sometimes white, with a basal rhomboidal purple eye. The eye contains an irregular lower half which is white. *Staminal column* creamy white; anthers reniform, yellow or white; filaments up to 1 mm long; pollen grains with both branched and nonbranched spinules. *Carpels* 5, united; stigma scarlet, 5-lobed. lobes minutely velvety, diverging after the opening of the flower. Ovary ovoid, 8 mm in diameter, hairy all over; style glabrous. *Fruit* capsular, 5-7.5 cm long and 2 cm broad, narrowly oblong with tapering, rather blunt apex; surface studded with a large number of tubercular bases from which stiff, bristly, greenish-white hairs originate; number of ridges on the fruit uniformly 5; dehiscing from top downward. *Seeds* round, black with numerous white concentric striations all over the surface, glabrous or rarely hairy; about 3 mm in diameter, hilum roundish, dark brown or black, glabrous.

Saharanpur, October, 1946, *H.B. SINGH* 950 (*Typus* in Herb. Ind. Agric. Res. Institute, New Delhi; *co-typus* in Herb. Dehra Dun); Lakhaoti near Bulandshahr, October 1947, *BHIM CHAND* (s.n.); Ajmer Merwara, Ajmer, October, 1950, *H.B. SINGH* 1325; Madhya Bharat, Indore, February, 1951, *H.B. SINGH* 1355.

A. tuberculatus resembles *A. esculentus* in several vegetative and reproductive characters. It is, however, conspicuous in having a tall habit, short internodes, rather small flowers, and profuse fruiting. The fruits have bristly hairs arising from tubercular bases. The spot at the base of the petal is not uniformly purple as it is in *A. esculentus*. The stigma is scarlet, whereas it is purple in *A. esculentus*.

The genus *Abelmoschus* Medik. was considered as a section of *Hibiscus* Linn., till 1924, when Hochreutiner (Candollea 2: 81, 1924) reinstated it as a distinct genus. It is now generally maintained as distinct from *Hibiscus* Linn.

Abutilon glaucum (Cav.) G. Don. Gen. Syst 1:504, 1831. *Sida glauca* Cav. Ic. 1:8, t. 11, 1785. *Abutilon muticum* G. Don. Gen. Syst. 1: 502, 1831; Mast. in Hk. f. FBI. 1:327, 1874.

An annual or suffrutescent herb. Leaves tomentose on both surfaces, toothed; petiole about 4 cm; stipules lanceolate reflexed. Peduncles as long as petiole, stout, jointed near the flower. Flowers large, orange. Calyx very tomentose, divided half way down. Fruits globose depressed at the summit. Seeds 3, scabrous.

Distribution:—North West Provinces, and Western Peninsula, Ceylon, Afghanistan, Trop. Africa, Egypt.

Abutilon theophrastii Medic. Malv. 28, 1789. *Abutilon avicennae* Gertn. Carp ii: 251; Mast. in Hk. f. FBI. 1: 327, 1874; Raizada in Journ. Ind. Bot. Soc. 14 (4):343, 1935.

A softly tomentose tall annual herb. Leaves orbicular cordate; petiole about 7-8 cm long, solitary, axillary. Peduncle about 2.5 cm, solitary, axillary. Flower yellow. Carpels 15-20, much exceeding the sepals, oblong, truncate, with 2 horizontally spreading awns.

Domakhand, Gorakhpur, *Sri Ram* Dehra Dun Herb. No. 55852.

Fl. April.

Distribution:—North West India, Sindh, Kashmir and Bengal, North Assam and Western and South Europe and also in North America.

Bogenhardia crispata (Linn.) Kearney in Leaf. West. Bot. 7: 120, 1954; HU in Fl. Chin. 153: 27, 1955. *Sida crispata* Linn. Sp. Pl. 685, 1753. *Abutilon crispum* (Linn.) Medic. Malv. 29, 1787 ('crispum'); Mast. in Hk. f. FBI. 1:327, 1874.

A large, annual herb growing upto 1.5 m tall. Leaves 2-7 cm long, ovate cordate, acuminate, crenate, stellate and villous on both surfaces. Flowers yellow, solitary, axillary, rarely in pairs; pedicels 1-3.6 cm long, jointed about the middle. Fruit 13 mm in diameter, globose; carpels 10, rounded at the apex, pilose and setose. Seeds 2-3 in each cell, reniform, black, uniformly white-scaly.

Fl. and *Fr.* July-Jan.

Distribution:—Western Peninsula, Nilgri Hills, the Deccan and Coromandel; Trop. and Subtropical America. A native of trop. America, naturalized in India, Australia and Hainan Islands.

The genus *Bogenhardia* Reichb. mainly differs from *Abutilon* Hill. in that in the former mature carpels are inflated and rounded at the apex, pericarp thin and chartaceous, while in *Abutilon*, mature carpels not inflated, rostrate at apex, pericarp firmly coriaceous.

Gossypium hirsutum Linn. Sp. Pl. 975, 1753; Mast. in Hk. f. FBI. 1: 347, 1874; Roberty in Candollea 13:5, 1950; HU in Fl. Chin.

Fam. 153. 66, 1955; Borssum in Blumea 14: 123, 1966; Fryxell in Brittonia 20: 382, 1968.

An erect, annual-perennial, suffruticose herb or shrub-like herb, glabrous except patently densely pilose stem-apices, petioles, nerves and pedicels. Leaves broadly ovate cordate, palmately 3-5-lobed into ovate-triangular acuminate lobes, punctate with black dots, glabrescent or slightly hirsute especially on the nerves; stipules ovate-falcate. Flowers white or pale yellow; pedicels upto 2 cm long; epicalyx-bracteoles ovate, with a cordate base, pectinate with 7-9 linear-lanceolate acuminate teeth, hairy outside; staminal-column short. Capsule ovoid, beaked, glandular-pitted.

A native of Central America, now naturalized in agricultural fields etc; Rispana, Dehra Dun C.R. Babu 34682.

Fl. and Fr. Sept.-March.

It differs from *G. barbadense* Linn. (= *G. arboreum* Linn. var. *nadam* (Watt.) Prokh.) to which it is closely allied by palmaripartite leaves with ovate-oblong segments, shorter petals, and shorter staminal-column.

Specimens from this area are referable to var. *hirsutum*, which can be distinguished from var. *taitense* (Parl.) Roberty by longer capsules, densely patently hairy or villous stems, petioles, pedicels and nerves beneath.

Hibiscus beddomei Rakshit et Kundu in Sc. & Cult. 27(4) : 193, 1961 et in Bull. Bot. Surv. Ind. 12 (1-4):160, 1970; Bhattacharya in Bull. Bot. Surv. Ind. 6 (2-4): 197, 1964.

Stem erect, densely covered with rigid stellate hairs; leaves ovate-cordate, 3-angled or slightly 3-lobed, 5-7 palmi nerved; lobes ovate, acute upper leaves narrow ovate or lanceolate; all serrate-dentate, hairy on both surfaces, usually more beneath; petiole pubescent with simple and stellate hairs; stipules linear. Flower axillary, solitary, medium sized; in terminal portions flowers are closer forming a more or less racemose inflorescence; pedicel short, 0.5 cm long, unjointed. Segments of epicalyx 9, 0.7 cm long shorter than calyx, linear, tip spatulate with 0.3 cm long linear appendage, covered with stiff hairs all through. Calyx campanulate, 1 cm long, 5-lobed upto middle; lobes deltoid, acuminate, 3-nerved, membranous hairy, persistent in fruit. Petals 5, hairy outside. Staminal column short. Ovary ovoid-oblong, densely covered with white silky hairs, chambers 5, many ovules in each chamber, axile placentation; stigma 5, reddish spreading above the staminal column. Capsule ovoid, beaked, densely hairy, equal to calyx, opening by five longitudinal valves.

The species is quite distinct and can be separated from other species of *Hibiscus*. It is separated from *H. radiatus*, by its unarmed nature, structure of leaves, shorter segments of epicalyx and calyx lobes.

Robertsgunge, Mirzapur dist. U.C. Bhattacharya 17710. Rare.

Distribution:—Reported only from Central and South India.

South India without precise locality Bedome 91 & 92 (Type in Herb. Cal); Central India without precise locality, Jerdon. (!)

Hibiscus furcatus Roxb. Hort. Beng. 51, 1814 nom. nud.; DC. Prodr. 1: 449, 1824; Spreng. Syst. 3: 102, 1826; Roxb. Fl. Ind. 3: 204, 1832; W. & A. Prodr. 1: 48, 1834; Dalz. & Gibs. Bom. Fl. 19, 1861; Mast. in Hk. f. FBI. 1: 335, 1874; Prain, Beng. Pl. 1: 267, 1903; Talbot, For. Fl. 1: 119, 1909; Gamble. Fl. Madr. 1 (1): 97, 1915; Haines Bot. Bhair & Orissa 2: 67, 1921; Van Waalkes in Blumea 14 (1): 59, 84, 1966; Nareesh Bahadur et al. in Journ. Bom. Nat. His. Soc. 70 (3): 495-497, 1973. *Hibiscus rostellatum* Guill. & Perr. Fl. Seneg. 1: 55, 1830; Mast. in Oliv. Fl. Trop. Afr. 1: 201, (1868); Keay in Fl. W. Trop. Afr. 2nd ed. 11 (2): 346, 1958. *Hibiscus aculeatus* Roxb. Fl. Ind. 3: 206, 1832. *Hibiscus hispidissimus* Griff. Notul. Syst. 4: 52, 1851. *H. furcellarioides* Hochr. in Ann. Conserv. & Jard. Bot. Geneve 20: 157, 1917.

An erect (or rambling) suffruticose slender shrub upto 4 m high with pungent, recurved prickles. Leaves 5 cm across, entire or slightly lobed, cordate, pubescent, crenate; stipules upto 0.5 cm long, linear-lanceolate. Flower large (5 cm in diam.) axillary, sub-racemose, distant with 10-12 setose formed bracteoles; calyx enlarged in fruit, very hispid and with shining bristles; corolla yellow with a crimson centre. Capsule 1 cm long, enclosed in the enlarged calyx.

Dehra Dun, Sauri Village, Raipur, D.P. Raturi 6151; Song River, Raipur, D.P. Raturi 6252; Pump-House near Ordnance Factory D.P. Raturi 6253.

Fl. Sep.—Oct. *Fr.* Nov.—Dec.

Distribution:—Tropics of the old World, common in hotter parts of India, ascending to 1200 m in N. W. Himalaya; plains of Peninsular India, Bengal and Orissa.

The specimens from North India have a very short peduncle (5-7 mm), a character which compares favourably with Roxburgh's description of the type. The specimens from South India, available in Dehra Dun Herbarium, however show a very long peduncle (4-5 cm) and agree with description of Talbot (1909) and others.

There also seems to be a correlation between the set of the peduncles and the lobation of leaves. The leaves of North India specimens have very short peduncles and are either entire or only superficially lobed while the specimens from South India have a long peduncle, and are invariably deeply lobed and are seldom (or rarely) entire.

Hibiscus mutabilis Linn. Sp. Pl. 694, 1753; Mast. in Hk. f. FBI. 1: 344, 1874; Bailey, Man. Cult. Pl. 666, 1949; Bor & Raizada in Beautiful Ind. Shrubs & Climbers 234, f. 135, t. 86, 1954.

A large, bushy, tomentose deciduous shrub. Leaves broad, ovate in outline, 3-5-lobed, 10-20 cm long, lobes triangular, acute or acuminate, shallowly crenate-dentate. Flowers axillary single or double, clustered at tips, white, rose, purple, turning red, 7.5-10 cm across. Staminal-tube not exerted. Ovary covered with a dense mat of short silvery hairs. Capsule subglobose, hirsute about 2 cm in diameter; seeds brown, densely bearded on one side.

Fl. Sept.-Oct. *Fr.* Oct.-Nov.

Distribution:—A native of China but has been in cultivation in India for a very long time.

Hibiscus rosa-sinensis Linn. Sp. Pl. 694, 1753; Mast. in FBI. 1: 344, 574; Bailey, Man. Cult. Pl. 665, 1949; Bor & Raizada in Beautiful Ind. Shrubs & Climbers 237, 1954.

An evergreen shrub about 3 m tall. Leaves alternate, stipulate, petiolate, 11-12.5 cm long, ovate-acuminate, coarsely serrate, 3-nerved at the base; stipules ensiform or subulate; petiole upto 2.5 cm long. Flowers solitary from the upper axils, pedunculate. Petals 5, crimson with a dark eye, obovate-obtuse, upto 10 cm long; bracts 7-9, linear. Staminal-tube red, exceeding the corolla. Ovary conical, obtuse; style filiform, dividing into 5 branches below the capitate red hairy stigmas. Fruit a capsule upto 2 cm long.

Fl. Feb.-Oct. Does not set seed in this country.

Distribution:—Probably a native of China now in cultivation in all warm countries.

The 'shoe flower' is commonly grown in gardens for its large, ornamental flowers. Double flowered forms are common and in others the corolla may be magenta, cherry, bright red, yellow or striped white and red.

Hibiscus syriacus Linn. Sp. Pl. 695, 1753; Mast. in Hk. f. FBI. 1: 344, 1874; Bailey, Man. Cult. Pl. 665, 1949; Bor & Raizada in Beautiful Ind. Shrubs & Climbers 238, f. 138, t. 90, 91, 1954.

An erect glabrous shrub reaching 2.5 m in height. Leaves alternate, petiolate, stipulate, wedge-shaped, 5-nerved at the

cuneate base, margin crenate; petiole upto 2.5 cm long. Flowers axillary, solitary, seated on stout peduncles which are shorter than the petioles. Flowers often double, rose or purple; purple-pink, deep purple, white, violet-red and pink forms are also commonly met with. Bracts 10, free almost to the base.

Grown in gardens for its pretty, rose-like flowers.

Fl. June-Oct. Does not set seed in this country.

Distribution.—A native of Syria but native country uncertain. It is commonly grown in the plains and in hill stations throughout India.

Malva Linn. (1753-1754).

Hu (Fl. Chin. Fam. 153. 4, 1955) maintained *M. sinensis* Cav. (1786), which was reduced to a variety of *M. mauritiana* L., for the plants of S.E. Asia, which were hitherto referred to *M. mauritiana* Linn. & *M. sylvestris* var. *mauritiana* Mill. & *M. sylvestris* Linn. (*silvestris*) as distinct species. If Hu's taxonomic concept of this species is accepted, then the correct name for this plant should be *M. sinensis* Cav. (1786), as it is illegitimate by being a later homonym of *M. chinensis* Mill. (1768) which is a basionym of *M. verticillata* var. *chinensis* (Mill.) Hu. Since there is no other published binomial for this plant, the author, therefore, proposes a new name *M. cavanillesiana* for this plant. The accepted nomenclature is as follows:

***Malva cavanillesiana* Raizada nom. nov.**

Malva sinensis Cav. Diss. 2: t. 25, f. 4, 1786 (non Mill. 1768); Hu in Fl. Chin. Fam. 153. 4, 1955.

M. mauritiana Linn. var. *sinensis* DC. Prodr. 1: 432, 1824.

M. sylvestris auctt. non Linn. 1753: Masters in Hk. f. FBI. 1: 320, 1874.

M. mauritiana auctt. non Linn. 1753, Bung in Mem. Acad. Sci. St. Petersburg. Sav. Etrang 2: 85, 1833.

M. sylvestris var. *mauritiana* auct. non Mill. 1768; Liu in Bull. Peking Soc. Nat. Hist. 2: 133, 1928.

***Malvaviscus konzattii* Greenm.** in Publ. Field Mus. Nat. Hist. Chicago (Bot.) 2: 233, 1912.

A shrub. Leaves ovate, entire, crenate-serrate. Bracteoles 7 or more. Flowers red or orange-red, on axillary peduncles, opening slightly at the top. Petals erect. Staminal column exserted.

Commonly grown in hedges of gardens and near houses for its beautiful Hibiscus-like flowers.

Fl. Major part of the year.

Pavonia patens (Andr.) Chiov. in Ann. Bot. 13: 409, 1914. *Sida patens* Andr. Bot. Rep. 9:t. 571, 1809. *Pavonia procumbens* (Wall. ex W. & A.) Boiss. Fl. Orient. 1: 837, 1867; Blatter in Journ. Bom. Nat. Hist. Soc. 34: 631, 1935; Raizada & Sharma in Ind. For. 88 (5): 359, 1962. *Pavonia glechomifolia* Garcke, in Schweinf. Beitr. Fl. Aethiop. 54, 1874; Masters in Hk. f. FBI. 1: 330, 1874. *Labretonia procumbens* Wall. ex W. & A. Prodr. 1: 47, 1834.

A suffruticose tomentose shrub with procumbent branches or sometimes upto 1 m high. Leaves alternate, ovate-cordate, acute or obtuse, crenate serrate, stellate hairy; petiole slender, hairy. Flowers solitary axillary on slender peduncles. Bracteoles 5-6, unequal, exceeding the calyx. Petals pale-yellow, obovate. Mericarps light brown, indehiscent, with a median-dorsal serrulate crest and three outer lateral stout tubercles on either side.

Foysagar, Ajmer distr., *V. S. Shrama* 193; Happy Valley, Ajmer distr. *V. S. Sharma* 363; Beawar-Shivpura Road, *V. S. Sharma* 1090; Jethana, Ajmer Distr. *V. S. Sharma* 1225.

Fl. & Fr. July-March.

Distribution:—North West Provinces, Sindh, Western Peninsula, Burma & Ceylon, Tropical Africa, Arabia.

Pavonia zeylanica (Linn.) Cav. Diss. 3: 138, t. 48, f. 2, 1787; Mast. in Hk. f. FBI. 1: 331, 1874; Raizada in Journ. Ind. Bot. Soc. 14 (4): 343, 1915. *Hibiscus zeylanicus* Linn. Sp. Pl. 698, 1753.

A glandular pubescent undershrub. Leaves small, more or less 3-5-lobed. Peduncles 1-flowered upto 3.6 cm long, articulated at about three-fourth of the length from base. Involucral bracts 2-12, twice as long or longer than the clyx. Carpels wedgeshaped, narrowly winged. Seeds brown-black, minutely pubescent.

Akhagitagarh and Taragarh, Merwara *Duthie* 4538; Etawah *R. S. Hole* Dehra Dun Herb. No. 24998; Jhansi, *Sri Ram* Dehra Dun Herb. No. 55853, 55854.

Fl. & Fr. throughout the year.

Distribution:—North West Provinces, Sindh and Western Peninsula and Ceylon. Tropical Africa, Mauritius.

Thespesia populnea (Linn.) Soland. ex Corr. in Ann. Mus. Par. 9:290, 1807; Blatt. & Mill. Beaut. Ind. Trees 141, t. 31, 1954. Mast. in Hk. f. FBI. 1: 345, 1874. *Hibiscus populneus* Linn. Sp. Pl. 694, 1753.

A small tree. Leaves about 6 cm in diameter, long petioled, rounded, acuminate, entire, 6-7-nerved with a glandular pore

beneath between the nerves; petiole about 6 cm. Peduncles axillary, shorter than petiole. Corolla about 3 cm in diameter, yellow with a purple throat, turning mauve; staminal tube toothed at the top; carpels 3 cm, oblong, depressed, scaly, ultimately glabrous, remaining long on the plant.

Occasionally cultivated in gardens especially in Delhi.

Fl. Aug.-Oct. *Fr.* Oct.-Dec.

Distribution:—Tropical shores of Bengal, Ceylon and both Peninsula; Trop. Asia, West Pacific Is., Africa, Java.

STERCULIACEÆ

Byttneria herbacea Roxb. Pl. Corom. 1 : 29, 1793; Mast. in Hk.f. FBI. 1 : 376, 1874; Haines Bot. Bih. & Or. 83, 1921; Gamble, Fl. Pres. Madr. 1 : 80, 1957 (Repr. ed.); Bhattacharya in Bull. Bot. Surv. Ind. 5(1):59, 1963.

A branched herb with perennial woody root-stock; branches long, slender, sometimes more than a meter long, sub-woody towards the base, 1-3 mm in diameter, often resting on ground or on neighbouring plants, minutely pubescent, older branches with black dots on one side. Leaves 5-10 cm long, alternate, often distant, ovate to narrowly ovate or lanceolate, acuminate, unequally toothed, subcordate and trinerved at base; petiole 0.8-1.2 cm long, slender, pubescent. Peduncle very narrow, 1-2 cm long, axillary or extra-axillary. Capsule pendulous, 0.6-1 cm across, pale green covered with short dark green soft spines, glabrous, 4-5 lobed, dehiscent. Seeds pale brown, elliptic, bluntly triangular.

Mirzapur, Hathinala forest, growing on the bank of stream on rock soil, *Bhattacharya* 18360.

Fl. Aug.-Sept. *Fr.* Dec.-Jan.

Distribution :—Bihar, N. Circars, Deccan, Karnataka and Orissa.

Dombeya cayexii Hort. Bailey, Man. Cult. Pl. 669, 1949.

A hybrid of *D. mastersii* Hook. f. and *D. wallachii* Jacq. Flowers beautiful pink, in pendulous, many flowered umbels.

Planted in gardens.

Fl. March-April.

Dombeya mastersii Hk. f. in Bot. Mag. 93, t. 5639, 1867.

A shrub with spreading tops. Leaves 7.5 cm in diameter slightly pubescent above, sometimes 3-lobed; petiole 5 cm long. Flowers white, fragrant, in many-flowered axillary umbels; peduncle and pedicels villous with long spreading hairs. Sepals

about 1.2 cm long. Petals about 2 cm long. Filaments united for half their length, so as almost to obscure the ovary. Ovary densely villous; styles free at the tips.

Commonly grown in garden.

Fl. March-April.

Distribution :—Indigenous in Tropical Africa.

TILIACEÆ

Grewia barberi J.R. Drum. in Gamble, Fl. Madras (ed. 2) 1 : 82, 1957; Panigrahi et al. in Bull. Bot. Surv. Ind. 11(1-2) : 98, 1969.

A small tree. Leaves 3-7-ribbed, linear or ovate lanceolate, glabrous, apex sharply acuminate, margin sharply serrate. Flowers yellow; peduncles about equal to the petiole; pedicels thickened upwards. Fruit normally deeply divided into 2 oval or emarginate lobes.

Bichhea, Bahraich District, Misra 7916, near Railway line, scarce.

Distribution :—Deccan in Mysore, Bellary and Coimbatore, W. Ghats from S. Canara to N. & E. slopes of Nilgiris.

Grewia hainesiana Hole in Ind. For. 43 : 316, 1917; Raizada in Journ. Ind. Bot. Soc. 14(4) : 344, 1935. *Grewia subinaequalis* DC. Prodr. 1 : 511, 1824; *G. asiatica* auct. non Linn.; Mast. in Hk. f. FBI. 1 : 386, 1874.

Common throughout the sub-Himalayan and Siwalik tracts of Northern India, (Hole), South India, Burma.

According to Hole this plant is not the same as *Grewia asiatica* Linn. which so far as is known, occurs only in cultivation, it is doubtfully wild in India and even in cultivation it is not common in the region of the Upper-Gangetic Plain. This tree, *G. hainesiana*, has more or less been correctly described by Duthie on p. 113 of his Flora but under the name of *G. asiatica*.

Burret described in Notiz Blat. Bot. Garten und Museum, Berlin lx, 663 a new species of *Grewia*, *Grewia mesopoda* Burret from Lachiwala, Dehradun. I have not seen his type specimen but judging from the locality, I have no doubt the species could not be anything than *G. hainesiana* Hole (*G. subinaequalis* Dc.) According to Narayanaswami & Rao (Journ. Ind. Bot. Soc. 29 : 187, 1951) *G. hainesiana* Hole is conspecific with *G. subinaequalis* DC.

Triumfetta annua Linn. Sp. Pl. 1753; DC. Prodr. 1, 507, 1824; Mast. in Hk. f. FBI. 1 : 396, 1874; Som Deva in Bull. Bot. Surv. India 10(2) : 179, 1968.

An annual upto 72 cm high with a line of hairs on one side, shifting at each joint. Leaves 10-12.5 cm by 5-10 cm ovate acuminate, toothed; petiole long. Stipules subulate. Peduncles about 1.2 cm, extra-axillary, 3-flowered. Petals orange, nearly as long as the apiculate sepals. Stamens 10. Fruit globose, glabrous, the size of a small pea, prickles hispid.

Below Rajpur *Som Deva* 2958; Mohand Pass, Saharanpur Siwaliks *Raizada*; *Som Deva* 1410 in dry river bed or shade of 'Sal' trees.

GERANIACEÆ

Geranium nepalense Sweet Geran. 1 : t. 12, 1820-22; Edgew. in Hk. f. FBI. 1 : 430, 1874; Knuth in Pfreich. 53 : 192, 1912; *Som Deva* in Bull. Bot. Surv. Ind. 10(2) : 179, 1968.

A diffuse perennial pubescent or softly hairy herb, 15-25 cm high. Leaves orbicular, 3-7.5 cm across, palmately 3-5 lobed; segments equal or sub-equal, irregularly lobed or toothed. Flowers 0.8-1.5 cm across, solitary or paired on long axillary peduncles. Petals pink, with 3 dark purple streaks within, slightly notched. Anthers purple. Capsule 1.5-2 cm long; mericarps smooth.

Sahasradhara along streams, *Raizada*; Rispana near Rajpur, *Som Deva* 369; Rajpur *Raizada*.

Fl. Apr.-Sept. Fr. Oct.-Nov.

Distribution :—Himalaya 1500-2700 m, China, Japan.

This species differs from both *G. mascatense* Boiss. (*G. ocellatum* Camb.) and *G. lucidum* Linn. in having larger flowers, perennial habit with a creeping rootstock and smooth mericarps.

Geranium rotundifolium Linn. Sp. Pl. 683, 1753; DC. Prodr. 1 : 643, 1824; Edgew. in Hk. f. FBI. 1 : 432, 1874; *Som Deva* in Bull. Bot. Surv. Ind. 10(2) : 180, 1968.

A very slender suberect herb with spreading branches, glandular hairy. Leaves reinform. 7-fid, segment broad obtusely lobulate, 1-3.5 cm across, petioles very slender. Flowers about 8 mm across; petals red, glabrous, cuneate, entire, exceeding the calyx. Carpels smooth, obliquely wrinkled. Seeds smooth, deeply pitted.

Near Rajpur, *Som Deva* 2198 on moist walls of Canal.

Fl. Apr.-Aug. Fr. Sept.-Oct.

Distribution :—Punjab, Western temperate Himalaya, Kashmir, Garhwal, Siberia and eastwards to Europe and N. Africa.

In addition to *Geranium nepalense* Sweet and *G. rotundifolium* Linn., *G. ocellatum* Camb., for which the correct name should be *G. mascatense* Boiss., as shown below, also occurs in the area as already reported by Duthie in his Flora.

Geranium mascatense Boiss. Diag. 1(1) : 59, 1842 et. Fl. Orient. 1 : 882, 1867. *Geranium bicolor* Royle, Illustr. 149, 1839, nomen. *Geranium choorense* Royle Illustr. 150, 1839, nomen. *Geranium ocellatum* Camb. in Jacq. Voy. Bot. 33, t. 38, 1844; Edgew. in Hk.f. Fl. Br. Ind. 1 : 433, 1874; Duthie, Fl. U.G.P. 1 : 130, 1903; Knuth in pflanzenreich 53 : 62, 1912.

This species is closely allied to *G. lucidum* Linn.; which differs from this in having longitudinally rugose mericarps and glabrousness.

Plants from this area are referable to var. *himalaicum* (Knuth) Raizada, *comb. nov.* (*G. ocellatum* Camb., var. *himalaicum* Knuth in Pfreich. 53 : 62, 1212).

It is unfortunate to replace the widely known binomial *G. ocellatum* Camb. (1844) in Jacq. Voy. Bot. 33, t. 38, 1844 by *G. mascatense* Boiss. (1842) for this plant, since there is no other alternative to avoid this change as the latter antedates the former. This change necessitates the following new combinations :

1. var. *yunnanese* (Knuth) Raizada *comb. nov.*
G. ocellatum var. *yunnanese* Knuth in Pfreich 53 : 62, 1912.
2. var. *africanum* (Knuth) Raizada *comb. nov.*
G. ocellatum var. *africanum* Knuth in Pfreich 53 : 62, 1912.
3. var. *camerunense* (Knuth) Raizada *comb. nov.*
G. ocellatum var. *camerunense* Knuth. in Pfreich 53:62, 1912.

OXALIDACEÆ

Oxalis corymbosa DC. Prodr. 1 : 696, 1824 (Jan. 1824); Calder in Rec. Bot. Surv. India 6(8) : 337, t. 9, 1912; Merrill in Sunyatsenia. 5 : 88, 1940; Backer & Bakh. f. Fl. Java 1 : 246, 1963; Hara Fl. E. Himal. 169, 1966; D.J. Young in Fl. Eur. 2: 192, 1968 fig. D.E.; Y. Nasir in Fl. W. Pakistan 4 : 6, 1971. *Oxalis martiana* Zucc. in Denkschr. Akad. Muench. 9 : 144, n. 6, 1825; Knuth in Pflnazenr. 95 : 250, 1930; Raizada in Journ. Ind. Bot. Soc. 14 : 345, 1935; Sharma in Ind. For. 95 : 313, 1969.

A perennial erect herb 15-30 cm tall, with scaly bulbs; bulbs 10-14 mm long, 6-10 mm across, acute at apex covered by

numerous scales. Leaves few, palmately trifoliolate; petioles 15-26 cm long arising directly from bulbs, thin flexuose, dilated below, sparsely hairy; leaflets 2-3.6 cm, broadly obcordate, punctate, entire, deeply emarginate with a narrow sinus at apex, cuneate at base, very shortly stalked; stalks pilose. Flowers in umbelliform 6-10-flowered cymes. Scapes 12-30 cm long, flexuose; pedicels 7-21 mm long, slender; bracts 1-2 mm long, ovate, pilose, acute at apex. Sepals five, free, about 5.5 mm long, ovate-elliptic, acute, with two 0.5-0.6 mm long linear orange-coloured glands at apex. Petals 5, free, rose purple, each 11-14 mm long, obliquely cuneate. Stamens 10, 5 short, alternating with 5 longer stamens; filaments united at base into a short tube; anthers 2-celled, oblong, dorsifixed, introrse, glabrous; ovaries angular; styles 5, free, densely clothed with ascending hairs; stigmas slightly 2-lobed, spreading.

Naturalised in damp shady places (orchards). Raizada. Plants do not set fruit in Dehra Dun.

Roshanara Gardens, Delhi, Maheshwari 1035; 1222.

Fl. Dec.-Apr.

Distribution :—Native of South America. Naturalized in Eastern Himalaya; Mungpoo, Assam, Dibrugarh, Paninsular India, Shevory and Pulney hills; Delhi according to Maheshwari. Well established according to Ridley in Madeira, Canaries, Azores, India, Ceylon, Penang, China, Japan, Jamaica extending to Australia (Queensland), Hongkong, Hawaii and North America.

Oxalis dehradunensis Raizada, nom. nov.

Oxalis intermedia A Rich. Eass. Fl. Cuba 315, 1845 (1842) (non Steud. April 1841); Knuth in Pfreich. 76 : 278, 1930; Backer & Bakhuizen f. Fl. Java 1 : 246, 1963. *Oxalis latifolia* auct. non H.B.K. 1821; Calder in Rec. Bot. Surv. Ind. 6 : 337, 1919; Raizada in Journ. Ind. Bot. Soc. 14(4) 344, 1935.

An acaulescent herb, 16-25 cm high with 2-6 long petioled radical leaves and 1-3 scapes, all arising from a solitary bulb which sends forth 3-4 offsets, terminating in small bulbs. Leaves 3-foliolate; leaflets almost sessile, broadly obdeltoid, 3-5.7 cm broad, cuneate at the base, glabrous, sub-bilobed, the lobes divergent and acute or round. Scapes 1-3, filiform with terminal 5-6-flowered umbels. Floweres pedicelled, 8-11 cm long; Sepals 5, oblong, biglandular towards the apex. Petals white or pink (turning purple or violet on drying), united at the base, corolla infundibuliform; longer filaments inappendiculate pubescent, shorter ones hairy. Ovary elongate, about 5-10 lobed; styles 5; stigmas 5.

Dehra Dun Raizada; Saharanpur M.A. Rau 14661; Har-

banswala Tea Estate, Dehra Dun, N.P. Singh 19673; Morthronwala, T.A. Rao 3280.

Completely naturalised in damp shady places, gardens and fields in Dehra Dun. Found as an escape or naturalized in many localities in India like Mussoorie, Simla, Shillong etc.

Fl. July-Nov.

It is a native of Mexico & West Indies.

It is closely allied to *O. latifolia* H.B.K. and indeed identified with it by Calder (loc. cit.), but the former is easily recognisable by appendiculate longer filaments and glabrous shorter filaments.

Since Richard's binomial is illegitimate by being a later homonym of *O. intermedia* Steud., which is a name-bringing-synonym of *Biophytum intermedium* (Steud.) Wt., and, as there is no other published epithet for this plant, the author proposes a new name, *O. dehradunensis*, for this plant.

It should be noted here that if Brizicky's view (Journ. Arn. Arb. 43 : 84-86, 1962) on the probable dates of publication of Richard's *Essai Fl. Cuba* (Hist. Phy. Polit. Hist. Nat. Cuba) Bot. Pl. Vas. [Ramon de la Sagra] is accepted, then the date of publication of the part in which *Oxalis intermedia* A. Rich. was published is 1841, a date which competate with the date of publication of Steudel's *Nomenclator Botanicus* (ed. 2) 2 : 240 which is April 1841.

Oxalis pes-caprae Linn. Sp. Pl. 434, 1753; Calder in Rec. Bot. Surv Ind. 6 : 329, t. 4, 1919; Fyson in Fl. South Ind. Hill Stations 1 : 75, t. 52, 1932; Raizada in Ind. For. Rec. (n.s.) Botany 4 (3) : 65, 1950.

A herb with a bulbous root-stock about 15-30 cm high. Leaves arising directly from the root-stock. Petiole slender, erect, 7-16 cm long, rarely upto 24 cm. Leaves trifoliolate, with obscurely pulvinate sessile leaflets. Leaflets 2-lobed, obcordate, cuneate at the base, membranous, glabrous above, some what villous beneath, spotted with blackdots which turn brown on drying. Scapes elongate, much longer than the petioles. Umbels few-or many-flowered, minutely bracteate; pedicels unequal, cernuous when young, erect at time of flowering, pilose. Flowers 2.5-5 cm long. Sepals 5, lanceolate, much shorter than the petals, acute with two contiguous glands towards the apex. Petals 5, golden-yellow, united a little above the base only, shortly clawed, about 1.5 cm long, glabrous. Stamens 10, alternately longer and shorter, united into a tube for considerable way, free above; ovary ovate. Styles 5, short, hairy, stigmas 5, capitate.

Meerut, *Yagya Dutt Tiagi*, Dehra Dun Herb. No. 105385.
Naturalised in shady places.

Fl. Feb.-May.

A native of the Cape of Good Hope and of recent introduction in this country. It has already been completely naturalised in Lahore and on the Nilgiris and Punley Hills.

BALSAMINACEÆ

Hydrocera triflora (Linn.) W. & A. Prodr. 140, 1834; Mast. in Hk.f. FBI. 1: 483, 1875; Raizada in Journ. Ind. Bot. Soc. 14(4): 345, 1935; Ventakeswarly & Dutt in Journ. Bom. Nat. Hist. Soc. 58(2): 545, 1961. *Impatiens triflora* Linn. Sp. Pl. 938, 1753.

An annual herb, with long fibrous root usually floating in water; branches 30-60 cm long, 5-angled, fistular. Leaves alternate, 2.5-12.5 cm long, linear-lanceolate. Stipules 0; leaf base glandular, glands 2. Flowers on short axillary 1-2-flowered peduncles. Fruit purplish red, a capsular berry dehiscent septically. Seeds usually solitary in each cell, curved and corrugated.

Bargad Chauki, Pilibhit, *Inayat* 25862.

Fl. & Fr. Practically throughout the year.

Distribution:—Throughout Bengal, the Eastern and Western Peninsula, Ceylon, Burma, Java; usually in marshes.

Impatiens scabrida DC. Prodr. 1:987, 1824 Hk.f. in FBI. 1:472, 1875; Som Deva in Bull. Bot. Surv. Ind. 10(2):180, 1968.

A pubescent herb. Stems 72 cm to 105 cm high. Leaves alternate, sessile or nearly so, ovate or lanceolate, 5-15 cm long, sharply toothed, teeth gland tipped. Flowers yellow, spotted, with brown, 3-4 cm long excluding the spur, single on axillary, usually paired stalks. Lip broadly funnel-shaped, abruptly contracted into a slender, cylindric, incurved spur, about 1.5 cm long, standard with a green horn-like outgrowth in the back, especially conspicuous in bud. Capsule linear about 4-5 cm, terete, acute.

Near Rajpur, *Som Deva* 790 in moist caves.

Fl. July-Sept.

Distribution:—Simla to Bhutan.

RUTACEÆ

Boenninghausenia albiflora (Hook.) Reichenb. ex Meissn. Conspect. 197, 1824; Hk.f. in FBI. 1:486, 1875; Som Deva in

Bull. Bot. Surv. India 10(2) : 180, 1968. *Ruta albiflora* Hook.
Exot. Fl. t. 79, 1823.

A perennial, nearly glabrous herb. Stems erect, 36-72 cm high, branching. Leaves gland dotted, 2-pinnate; leaflets ovate, about 1.2 cms, entire. Flowers bisexual, white, about 9 mm long, in a terminal leafy panicle. Calyx very small. Petals oblong, obtuse. Pedicels of ovary of varying length. Fruit about 8 mm across.

Sahasradhara, Raizada, Saxena, Som Deva 1321.

Fl. July-Sept.

Distribution : —Temperate Himalaya, from Murre to Sikkim, Khasi Mts., Japan.

MELIACEÆ

Dysoxylum binectariferum (Roxb.) Hk.f. ex Beddome in Trans. Linn. Soc. 25 : 212, 1866; Hiern in Hk. f. FBI. 1 : 546, 1875; Santapau, Fl. Khandala 36, 1967; Osmaston. For. Fl. Kumaon 87, 1927; Raizada in Journ. Ind. Bot. Soc. 14(4) : 345, 1935. *Guarea binectifera* Roxb. Fl. Ind. 2 : 240, 1824.

A tree about 15 m high. Young shoots and inflorescence minutely puberulous. Leaves alternate, imparipinnate. Leaflets 6-11, alternate. Flowers 7-10 mm in diameter, in terminal panicle 5-10 cm long. Capsule 2.5-4 cm in diameter, orange, globose or pyriform, containing 1-3 large, black seeds enclosed in scarlet aril.

Haldwani division, U.P., *Champion* Dehra Dun Herb. No. 32888, 32889. Pilapani, Haldwani Division, *Osmaston*, 1227.

Fl. Sept. Fr. Dec.

Distribution:—Khasi Mts. and Assam, Western Peninsula from Concan south wards; Ceylon.

Incidentally the correct name of *Dysoxylum hamiltonii* Hiern, a species which occurs in Assam, is *D. alliarum* (Buch.-Ham.) Balak. in Journ. Bom. Nat. Hist Soc. 67 (1): 57, 1970, as it is based on *Guarea alliarum* Buch.-Ham. in Edin. Mem. Wern. Soc. 6 : 305, 1832.

ICACINACEÆ

Natsiatum herpaticum Ham. ex Arn. in Edin. New Phil. Journ. 16: 314; Mast. in Hk. f. FBI. 1:595, 1875; Raizada in Journ. Ind. Bot. Soc. 14(4): 345, 1935.

A slender climber, stem somewhat woody at base. Leaves alternate, petiolate, cordate, 7-9-nerved. Racemes supra axillary,

long, pendulous. Flowers dioecious, greenish-yellow, minute with a foetid smell. Fruit a small, slightly fleshy drupe, black when ripe.

Dogari, Haldwani division, *Osmaston* 1317; Senapani, Haldwani, *Champion*, Dehra Dun Herb. No. 45243.

Fl. Cold Season *Fr.* March-April.

Distribution:—Eastern Bengal and the Himalaya from Nepal, Sikkim, and Khasi Hills (9000 m) to Bangladesh and Burma.

CELASTRACEÆ

Maytenus falconeri (Laws.) M.A. Rau, in Bull. Bot. Surv. Ind. (Suppl. 2) 10: 20, 1968, (published 30.6.69); *Gymnosporia falconeri* Lawson in Hk. f. FBI. 1: 620, 1875; Raizada in Journ. Ind. Bot. Soc. 14(4): 346, 1935.

An erect evergreen shrub, 10-25 cm high. Leaves 2-6 cm long, elliptic or ovate, serrulate, clothed on both surfaces with short white pubescence which is denser beneath. Flowers small in fascicled axillary few-flowered cymes. Capsule about 1 cm long, turbinate, 3-celled, slightly lobed, smooth, brown; seeds enclosed in white aril.

Fairly common throughout the sub-Himalayan tract in Ramnagar and Haldwani division.

Fl. March *Fr.* Dec.

Distribution:—North West India.

Exell in Bull. Soc. Brot. (Ser. 2) 26: 223. et seq. 1952, Blacklock and others have merged *Gymnosporia* Benth. and Hk f. in *Maytenus* Mol.

Maytenus falconeri (Lws.) M.A. Rau, var. *kanjilalii* (Raizada) M.A. Rau, Bull. Bot. Surv. Ind. (Suppl. 2) 10:20, 1968, (1959); *Gymnosporia falconeri* var. *kanjilalii* Raizada in Journ. Bom. Nat. Hist. Soc. 54: 796-797, 1957.

This differs from typical *M. falconeri* in having glabrous leaves, smooth on both surfaces, and longer and larger fruit (9 mm-14 mm long).

Tulsipur, Gonda, *Sri Ram*.

Salacia chinensis Linn, Mant. 2: 293, 1767; Gmel. in Linne, Nat. Reg. Veget. ed. 13,1: 107, 1791 (*sinensis*); Ding Hou in Fl. Males. Ser. 1. 63: 419, 1964. *Tonsella prinoides* Willd. Ges. Naturf. Fr. Neue Schr. (Act. Acad. Cur. Berl.) 4: 184, 1803. *Tonsella chinensis* (L.) Spreng. Syst. 1: 177, 1824. *Salacia prinoides* (Willd.) DC. Prodr. 1: 571, 1824; W. & A. Prodr. 1:

105, 1834; Lawson in Hk. f. FBI. 1: 626, 1876; Kurz For. Fl. Bur. 1: 260, 1877; Merr. Enum. Philip. Pl. 2: 487, 1923; Loes in Engl. & Prant. Pflanzenfam. ed. 2, 206: 388, 1942. *Salacia latifolia* Wall. ex Laws. in Hk. f. FBI. 1: 629, 1875; King in Journ. As. Soc. Beng. 65 (2): 366, 1896; Amshoff in Blumea 5: 578, 1945.

A large evergreen woody climber. Stipules deltoid or reniform, 1/3–1/2 mm long. Leaves opposite, 4–17 cm long, coriaceous, oblong or elliptic, serrulate; petiole 1–1.5 cm. Pedicels 5–10 (–18) mm. Flowers 2–6, clustered together on axillary tubercles, pale yellow, about 1 cm across. Stamens 3; ovary 3-celled with 2 ovules in each cell; disk annular. Fruit baccate, scarlet when ripe, globose, upto 1.5 cm across, usually 1-seeded.

Banki Forests, Gorakhpur, Sri Ram Dehra Dun Herb. No. 52594.

Fl. Dec.–Jan. Fr. cold season.

The epithet *chinensis* was changed into '*sinensis*' by Gmelin (l. c.); it was not that of a new species, as Gmelin cited literature of Linne.

Distribution:—Widely distributed but scattered in India, Ceylon, Burma, Thailand, Indo-China, China and throughout Malesia, N. Queensland, Solomon Is. and as far as Fiji.

The erect form of this species has not been recorded from our area.

RHAMNACEÆ

Ziziphus hysudrica Hole in Ind. For. 44: 505, 1918; Raizada in Journ. Ind. Bot. Soc. 14 (4): 346, 1935. *Ziziphus jujuba* Lamk. var. *hysudricus* Edgew. in Journ. Linn. Soc. 6: 201–202, 1862; Lawson in Hk. f. FBI. 1: 633, 1875.

A medium-sized evergreen tree often attaining large girth: branches mostly erect, not drooping, spines very variable, large, in subequal pairs on young plants, often wanting on older trees. Leaves 2–5 cm long or smaller on young plants, from elliptic to broadly ovate or orbicular, rounded at both ends, often oblique at the base, 3-nerved; nerves prominent above; petiole about 10 mm long. Flowers as in *Z. jujuba* Lamk. non Mill. (*Z. mauritiana* Lamk.)

Ajmer, Duthie 6623, 6624.

Fl. and Fr. Cold season.

The original spelling of the genus is *Ziziphus* not *Zizyphus*.

VITACEÆ

Ampelocissus divaricata (Wall. ex Lawson) Planch. in Journ. Vigne Amer. 375, 1884 and in DC. Monog. Phan. 5: 378, 1887; Suessenguth in Pfam. (ed. 2) 20 d: 306, 1953; S. K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6 (1): 40, 1971. *Vitis divaricata* Wall. ex Lawson in Hk. f. FBL. 1: 657, 1875; Collett, Fl. Sim. 95, 1902.

An extensive climber. Leaves palmately 3-rarely 5-foliolate; occasionally simple, lobed or imperfectly 3-foliolately divided; leaflets ovate, upto 24 cm long, lateral leaflets oblique, cuspidate-serrate, clothed with deciduous tomentum beneath; peduncles bearing a branched tendril below the flowers. Flowers minute, red. Fr. black, globose, 5-10 mm in diameter.

Sahasradhara, S. K. Malhotra 31387.

Cayratia trifolia (Linn.) Domin in Biblioth. Bot. 89: 371, 1927; Suesseng. in Pflanzenfam. (ed. 2) 20 d: 280, 1953. *Vitis trifolia* Linn. Sp. Pl. 203, 1753; Duthie Fl. Upper Gang. Plain 1:174, 1903. *Cissus carnosa* Lamk. Encycl. 1:31, 1783. *Cayratia carnosa* (Lamk.) Gagnep. in Not. Syst. 1:34, 1911; *Vitis carnosa* (Lamk.) Wall. ex W. & A. Prodr. 127, 1834; Lawson in Hk. f. Fl. Br. Ind. 1:654, 1875.

The plants from Dehra Dun differ from the typical variety in having hairy leaves, longer petals and bigger fruits and are referable to var. *cinerea* (Lamk.) Raizada, *com. nov.* *Cissus cinerea* Lamk. Illustr. 1: 332, 1792 (1797); *Cayratia carnosa* var. *cinerea* (Lamk.) Gagnep. in Not. Syst. 1: 348, 1909.

Mahoba, Hamirpur dist., U.C. Bhattacharya 17954; Chitrkut, Banda distr. M.A. Rau 3700; Near Col. Brown's School, Rispana, Dehra Dun C. R. Babu 35294; Chopan, Mirzapur dist., U.C. Bhattacharya 18376; Shahi, Pilibhit, C.L. Malhotra 42457; Charkhari, Hamirpur dist. C. L. Malhotra 21482; Malani, C.L. Malhotra 22862; Jarwa, Nepal border M.A. Rau 12086.

Fl. & Fr. Oct. Nov.

Distribution:—Tropical Himalaya and throughout the hotter parts of India from Punjab and Burma to Ceylon.

The genus *Cissus* Linn. is closely allied to *Cayratia* Juss., but can be easily differentiated by simple leaves and 1-2 seeded berries. It is represented in the area by woody climbers like *C. adnata* (Roxb.) Wall., *C. repanda* Vahl (= *Vitis repanda* W.&A.).

In addition to *Cayratia trifolia* (L.) Domin, eleven other species of *Vitis* sensu lato, according to Duthie & Rau are found in the Upper Gangetic Plain. They are: *Vitis vinifera* Linn., *Vitis*

parvifolia Roxb., *Tetrastigma serrulatum* (Roxb.) Planch. (= *V. capriolata* Don), *Tetrastigma lanceolarium* Planch. (= *V. lanceolaria* Wall. pro parte); *Tetrastigma campylocarpa* (Kurz) Planch. (= *V. campylocarpa* Kz.), *Cissus rosea* Royle (= *V. rosea* Royle), *Cissus repanda* Wall. (= *V. repanda* W.&A.); *Cissus adnata* Royle (= *V. adnata* Wall. p.p.); *Ampelocissus arnottiana* Planch. (= *V. indica* W. & A. (non Linn.)), *Ampelocissus rugosa* (Willd. ex Brandis) Planch. (= *V. rugosa* Wall. ex Brandis) & *Ampelocissus latifolia* (Roxb.) Planch. (= *V. latifolia* Roxb.).

Incidentally another species of *Vitis*, viz., *Vitis Jacquemontii* Parker (For. Fl. Punjab ed. 2 (1934) p. 559 is an *Ampelocissus* & needs a new name, *Ampelocissus jacquemontii* (Parker) Raizada com. nov. It occurs in the Himalayan and sub-Himalayan tracts from Indus eastwards, ascending to 2,4000 ft. but is not found in the region of this Flora. It has usually been referred, according to Parker (lo. cit.) to *V. lanata* Roxb. and has been confused with *V. rugosa* Wall. from both of which it is distinct.

Cissus auriculata D.C. Prodr. 1: 632, 1824. *Vitis auriculata* Roxb. Fl. Ind. 1: 411, 1820; Laws. in Hk. f. FBI. 1: 658, 1875; Raizada in Journ. Ind. Bot. Soc. 14 (4): 347, 1935.

A soft-wooded climber with corky bark when old. Tendrils 2-fid. Leaves digitately 3-5-foliolate. Leaflets 5-7.5 cm long, terminal largest, glabrescent above, pubescent beneath. Inflorescence axillary on long peduncled divaricating compound cymes. Flowers small, bisexual, tetramerous, greenish. Berry about 2 cm across, roundish, 1-seeded.

Kalyanpur, Manikpur range, South Banda, Sri Ram Dehra Dun Herb. No. 42547; P.C. Kanjilal, Dehra Dun Herb. No. 52546, and 52548.

Fl. Rainy Season. Fr. Oct.

Distribution:—Sikkim Himalaya, Bengal, Mysore, Bangladesh. Burma.

The record of this species is based on somewhat imperfect material in Herb. Dehra Dun.

Tetrastigma campylocarpum (Kurz) Planch. in DC. Mon. Phan. 5: 437, 1887; Craib, Fl. Siam. Enum. 1 (2): 311, 1926 (Oct.) *Vitis campylocarpa* Kurz in Journ. As. Soc. Beng. 41 (2): 302, 1872 et For. Fl. Burma 1: 274, 1877; Lawson in Hk. f. FBI. 1: 657, 1878; Kanjilal et al. Fl. Assam 1 (2): 297, 1936. *Vitis parkeri* Gagnepain ex Osmaston in For. Fl. Kumaon 124, 1927; Raizada in Journ. Ind. Bot. Soc. 14 (4): 347, 1935.

A large ever green climber with stems upto 22 cm in diam. and 27 m high. Stems terete. Bark reddish-brown, very rough and rather corky, furrowed and often deeply so. Blaze very

fibrous, pink or white streaked with pink turning orange on exposure, very shiny and turning purplish black on the blade of a knife. Tendrils simple, often short and long. Twigs small, green, glabrous, without prominent lenticels. Leaves digitately 3-6-foliolate, never pedate; petiole 4-8 cm long, terete, basal 0.5 cm, swollen. Terminal leaflet 4-7 by 2.5-4 cm, elliptic, abruptly acuminate, often caudate, glabrous, rather thick, dark, somewhat shining green above, paler and shining beneath, lateral nerves 3-7 pairs, arcuate; lateral pairs of leaflets smaller. Petiolule of terminal leaflets 0.5-1.75 cm long, of the lateral shorter. Flowers polygamodioecious, 4-merous, in lax, rather slender, puberulous, subcorymbose, axillary cymes. Fruit 0.4-0.8 cm long, oblong or ovoid, first reddish and finally black. Seeds 1-3, usually 1, ellipsoid, 0.3-0.5 cm long with 6-10 shallow transverse furrows.

Osmaston first collected this in the Ramanagar Div. where he found it fairly common in Sal forest between 1500-3000 ft. especially in moist ravines and on the banks of shady streams. On these specimens M. Gagnepain has named the Vine *V. Parkeri*. It may, however, be doubted whether it is not the *V. campylocarpa* of Kz., but the description of that author is very meagre and M. Gagnepain himself seems to have been in doubt as to what that species really was. *V. Parkeri* occurs throughout the sub-Himalayan tracts and outer hills ranges.

(Actually on the sheet in Gagnepain's handwriting the label is *Tetrastigma parkeri* Gagnep.).

Gajrea, Ramnagar div. U.P. *Osmaston* 1175, 1226, 1211, Goliapani Block, Haldwani Div. *Osmaston* 1284.

Parker has written on sheet no. 1175; stigma very obscurely 4-lobed. Petals calypriform (*Tertrastigma* sp.). Gagnep. on this sheet 1175 writes *Tetrastigma Parkeri* Gagnep. On another sheet Osmaston Dehra Dun Herb. No. 21242 from Jealkot, Nainital, 4000 ft. Gagnepain says corresponds to *Vitis campylocarpa* Kurz. *Tetrastigma parkeri* sp. nov. (M. Maulik has identified 1175 & 1284 as *Tetr. campylocarpum* (Kz.) Planch.

Fl. Nov. Dec. Fr. March-May.

Distribution:—Assam fairly common in the evergreen forests in Upper Assam and Surma valley in the vicinity of hills.

ANACARDIACEÆ

Rhus cotinus Linn. Sp. Pl. 267, 1753; Hk. f. in FBI, 2: 9, 1876; Som Deva in Bull. Bot. Surv. Ind. 80 (2): 180, 1965.

A shrub or small tree. Leaves simple, long stalked, obovate or ovate; 5-10 cm, entire, stalks and lower surfaces pubescent. Flowers pale purple, in drooping, hairy panicles, 7-14 cm

long; fertile flowers few. Sepals linear-oblong, obtuse. Petals twice as long, elliptic. Stamens shorter than petals; anthers large. Drupe hairy, cordate about 5 cm long, unequally lobed; after flowering the stalks of numerous sterile flowers become elongated and covered with long silky hairs, forming a spreading panicle of slender, feathery branches.

Sahasradhara, *Som Deva* 2186; *S.K. Malhotra* 28144, 30763. Fl. March-April.

Distribution:—Western subtropical Himalaya from Murre to Kumaon; East Asia, S. Europe.

PAPILIONACEÆ

Alysicarpus meeboldii Schind. in Fedde, Repert. Spec. Nov. Reg. Veget. 21:13, 1925; Raizada in Journ. Ind. Bot. Soc. 14 (4): 156, 1935.

An erect under shrub; stem terete, sparsely adpressed pilose or glabrous. Stipules scarious, striate, lanceolate, acute, glabrous up to 2 cm long. Leaves 1-foliate, petiolate; petiole small slightly winged, ciliate. Leaves lanceolate or linear-lanceolate, thin, glabrous above, strigose beneath, up to 14 cm long. Recemes terminal, laxly cylindrical, about 25 cm long. Flowers pedicelled, pedicels glabrous. Corolla shorter than calyx. Pod exceeding the calyx, jointed; joints 4-5, prominently marked with transverse ribs.

Etawah, *Duthie* 6366.

This species, I believe is probably only a more vigorous form of *A. glumaceus* DC. var. *ludens* (Baker) Santapau (= *A. rugosum* DC. var. *ludens* Baker in Hk. f. FBI. 2: 159, 1875) = *A. ludens* Wall. ex Backer in School flora 349, 1911 et in Fl. Jav. 1: 610, 1963 and hardly specifically distinct.

Incidentally the correct name of *Alysicarpus rugosus* (Willd.) DC. is *A. glumaceus* (Vahl) DC. Prodr. 2: 353, 1825 (non Roth) Schindl. 1925) as it is based on *Hedysarum glumaceus* Vahl Sym. Bot. 2: 106, 1791.

The names of 4 varieties, 3 of which occur in the region of the flora are as follows:—

1. *Alysicarpus glumaceus* (Vahl) Dc var. *styracifolius* (Baker) Raizada, *com. nov.* *A. rugosus* var. *styracifolius* Baker in Hk. f. Fl. Br. Ind. 2: 157, 1876 (excl. var. *pilifer* Wall.)

This variety has also been mentioned by Duthie in his Flora 1: 278, 1903 and is found in Agra district and Bundelkhand; also in Konkan, Sindh, etc.

2. *A. glumaceus* (Vahl) DC. var. *heyneanus* (Baker) Raizada com. nov. *A. rugosus* var. *heyneanus* Baker in Hk. f. FBI. 2: 159, 1876.

This variety according to Duthic loc. cit. is found in Bundelkhand; common in Bombay Presidency.

3. *A. glumaceus* (Vahl) DC. var. *minor* (Prain) Raizada com. nov. *A. rugosus* var. *minor* Prain in Journ. As. Soc. Beng. 66: 384, 1898.

This variety according to Duthie loc. cit. occurs in Dehra Dun, plains of W. Punjab, Rajputana & Deccan.

4. *A. glumaceus* (Vahl) DC. var. *pilifer* (Prain) Raizada com. nov. *A. rugosus* var. *pilifer* Prain in Journ. As. Soc. Beng. 66: 384, 1898.

This variety is found in the hills of Deccan and Carnatic and has not so far been reported from the region of the Flora.

Argyrolobium flaccidum (Royle) Jaub. & Spach. III. 1: 115, 1843; Baker in Hk. f. FBI. 2: 63, 1876; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 180, 1968. *Cytissus flaccida* Royle III. Bot. Himalayan 197, 1835.

A small, erect shrub densely covered with short, appressed, silky hairs; branches 30-45 cm, sometimes dwarfed to less than 15 cm. Leaves of 3 leaflets; leaflets sessile, lanceolate, acute, 1.2-2 cm. Flowers yellow, few, in short racemes. Calyx deeply 2-lipped, upper lip 2-toothed, lower 3-toothed. Petals glabrous, hardly longer than calyx, standard notched. Stamens all united in a tube; ovary sessile, style incurved. Pod 2-2.5 cm long, silky hairy. Seeds 6-8.

Rispana bed, near Rajpur, *Som Deva* 1408.

Fl. May-July. *Fr.* Sept.-Oct.

Distribution:—N. W. India ascending to 27,000 m.

Astragalus scorpiurus Bunge Mon. Imp. Academy St. Petersburg 1: 5, 1868 et ii. 3, 1869; Ali in Kew Bull. 13 (2): 305, 1958; Babu in Bull. Bot. Surv. Ind. 6: 200, 1966. *Astragalus subumbellatus* sensu Baker in Hk. f. FBI. 2: 119, 1176. (non Klotzsch, 1862), pro parte. *Astragalus punjabicus* Sirjaev in Brittonia 7: 275, 1951.

An annual trailing herb up to 36 cm, branched, clothed with short deciduous ascending white hairs. Leaves 2-5 cm; leaflets 5-7 pairs, subsessile, oblong, glaucous, thinly or densely pilose or nearly glabrescent; stipules minute, subulate or lanceolate-cuspidate. Racemes 4-6 cm long, distinctly peduncled, 4-6 flowered, lax or close; pedicels very short, bracts minute, setaceous. Calyx thinly pubescent, teeth setaceous, as long as

tube. Corolla purplish tinged with pink more than twice as long as the calyx. Pod 14-18-seeded, 1-2.5 cm long, cylindrical, much recurved, shortly pubescent, almost completely bilocular.

Rispana, Dehra Dun, C.R. Babu 35206-grassy sandy areas of river beds, rare.

Fl. & Fr. March-May.

Distribution:—W. Pakistan, Baluchistan, N.W.F. Province, Punjab & Afghanistan.

Closely allied to *A. subumbellatus* Klotzsch with which it was lumped by Baker (loc. cit) but can be easily distinguished by many ovuled ovary.

Atylosia elongata Benth. Pl. Jungh. 243; 1853; Baker in f. Hk. FBI. 2: 215, 1876; Sunil Kumar Mukherjee in Journ. Bom. Nat. Hist. Soc. 51: 446, 1952.

A slender herbaceous twiner; leaflets membranous obovate-cuspidate, obscurely hairy beneath. Racemes 2-4-flowered, long peduncled; calyx teeth long; corolla scarcely exceeding the calyx, little exerted. Pod 3-4-seeded, oblong, distinctly lineate, beaked.

Ridge at Delhi, *Sunil Kumar Mukherjee*. Rare.

Fl. & Fr. Aug.-Dec.

Distribution:—Nepal, Khasia and Assam.

Clitoria biflora Dalz. in Kew Journ. ii: 35, 1850; Baker in Hk. f. FBI. 2: 203, 1875; Raizada in Journ. Ind. Bot. Soc. 14 (4): 150, 1935.

A herbaceous climber; stems angular, young branches densely pubescent. Leaves imparipinnate, leaflets 5, membranous; terminal one largest, variable in shape, broadly elliptic-oblong. Flowers in axillary 2-flowered racemes; bracts linear-lanceolate, subulate; corolla about 2.5 cm long, blue; pod 2.5-5 cm long, flat, reticulately veined, pubescent. Seeds 5-6.

New Forest, Dehra Dun *Raizada*; *H.B. Naithani* 1897, Bidholi, Dehra Dun, *Sohan Lal* Dehra Dun Herb. No. 28454, Robber's Cave, C.R. Babu 29699.

Fl. Rainy season *Fr.* Aug.-Oct.

Distribution:—Konkan.

Crotalaria pallida Ait. Hort. Kew. 3: 20, 1789; Polhill in Kew Bull. 22: 262, 1968. *Crotalaria mucronata* Desv. Journ. Bot. Appleo. 3: 76, 1814; De Munk in Reinwardtia 6: 209, 1962. *Crotalaria striata* DC. Prodr. 2: 131, 1825; Baker in Hk. f. FBI. 2: 84, 1875; *C. saltiana* (non Andr. 1811) Prain ex King in Journ. As. Soc. Beng. 66 (2): 41, 353, 1892; Raizada in Ind. For. Rec. n.s. Botany 4 (3): 66, 1950.

An erect low shrub with thinly silky branches. Leaves 3-foliate; leaflets elliptic, membranous, up to 12 cm long, acute or rounded at apex, obscurely silky below. Racemes 20-50-flowered reaching up to 36 cm long; corolla twice the length of calyx, glabrous, yellow striped with red. Pods deflexed, rather recurved, 2.5-6 cm long, 20-30-seeded.

Dehradun *Raizada* Dehradun Herb. No. 78313.

Fl. and *Fr.* Cold season.

Distribution:—Himalaya and Ceylon and Malacca, Malaya, tropical America and Africa.

The above plants belong to var. *pallida*.

Crotalaria ramosissima Roxb. *Fl. Ind.* 3: 268, 1834; Baker in *Hk. f. FBI.* 2: 80, 1876.

An erect much branched woody annual herb. Stem densely coated, like the leaves, with thick silky brown hairs. Leaves crowded, subsessile, subobtusate, thick, cuneate at the base, about 2-3 cm long. Bracts lanceolate, persistent, silky on the back, black and viscous on the base. Calyx teeth long, linear with reflexed edges, dark brown. Corolla little exerted, about 1.2 cm; standard pointed, silky on back, dull orange yellow. Pod sessile, as long as the calyx, oblong, densely silky, 1-seeded, scarcely exerted.

Mirzapur, Sirsi Falls *U.C. Bhattacharya* 18304. Fairly common.

Fl. and *Fr.* Sept.-Oct.

Distribution:—Western Peninsula and Eastern Bengal.

Derris macrocarpa Thothathri in *Bull. Bot. Surv. Ind.* 3 (2): 192-193 t. 9, f. 1-3, 1961; Naithani & Raizada in *Ind. For.* (in press).

A climbing shrub. Leaves alternate, imparipinnate, stipulate 19.5-21.4 cm long; rachis glabrous, grooved above; stipules small, ovate; leaflet 7-9, opposite, obovate, 6-11.3 cm long, 3.5-5 cm wide, entire, cuneate at base, obtuse at apex, tip occasionally shortly cuspidate, subcoriaceous to coriaceous, glabrous above, light glaucous beneath, exstipulate; lateral nerves 8-10 pairs, more clearly visible on the back than above, petiolule 5-6 cm long, wrinkled. Inf. racemose, nodes produced into short stalks which bear 2-3 pedicellate pods; rachis glabrous. Flowers not known. Pods flat, oblong, very long, 5-12.4 cm, 2.2-2.7 cm wide winged on both sutures, the wings on the lower suture less developed than the upper, glabrous, faintly veined, apex narrow at times, 1-3 seeded. Seeds 1.2 cm long, 6.7 mm wide, faintly veined, curved towards the micropylar side, black, shining.

Nishangara, Bahraich dist., April 1920, *Sri Ram* 2667 A (Holotype in Herb. DD); 2667B isotype in Herb. DD.; Sakhni, Gorakhpur dist. *Sri Ram* (12-3-20) 2 sheets in DD.; Haines 2385/592 (30.1.1907) in Herb Dehra Dun from Santhal Pargana, Bihar is also referable to this species.

Fr. March-April.

Distribution:—Uttar Pradesh & Bihar.

This species is related to *D. cuneifolia* Benth. in which species the leaflets are thin; pod ovate orbicular, to oblong, 3-5 cm long, 2-2.3 cm wide, reticulately veined, wing on the lower suture obscurely developed, whereas in *D. macrocarpa* leaflets are thick, pod oblong, very long, 5-12.4 cm long, 2.2-2.7 cm wide; faintly veined, winged on both sutures. It is closely related to *D. cuneifolia* in leaf characters, nature of infl. and the calyx cup being glabrous but markedly differs from it in pod characters.

Derris scandens (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth. in Bull. Bot. Surv. Ind. 13 (1 & 2): 164, 1971; *Derris temoriensis* (DC.) Pittier var. *saharanpurensis* Thoth. in Bull. Bot. Surv. India 12: 105, 1970.

The var. *saharanpurensis* differs mainly from the typical plant in the slender and longer pedicles and thin pods which are slightly constricted between the seeds.

Bot. Garden, Saharanpur 1895 *E. Kleingen* 1305/87 (LE). Not seen and described by Thothathri l.c. (1970).

Pittier in his monograph (Contrib. U.S. Nat. Herb. 20: 41, 1917) on the Middle American species of *Lonchocarpus* changed the nomenclature of *Derris scandens* (Roxb.) Benth. to *D. temoriensis* (DC). Pittier, basing on *Dalbergia temoriensis* DC. (1825). He agreed that the name *Dalbergia scandens* Roxb. (1825) upon which *Derris scandens* was erected (Bentham Journ. Linn. Soc. 4 (Suppl.): 1-128, 1860) has been antedated by the existence of an earlier name *Deguelia scandens* Aubl. (1775) for a distinct species of present day *Derris* from Guiana. According to him the Guiana plant (*Derris scandens*) should be rightly called *Derris scandens* (Aubl.) Pittier and the name of the Asiatic plant in question (*Derris scandens* Benth.) should be changed to *Derris temoriensis* (DC.) Pittier, basing upon the next available epithet *Dalbergia temoriensis* DC. (1825).

Thothathri too at first concurred with Pittier's argument in recognising (Thothathri, Bull. Bot. Surv. Ind. 12: 104-107, 1970) *Derris temoriensis* (DC.) Pittier as the correct name for the Asiatic plant (*Derris scandens* Benth.) described a new variety '*saharanpurensis*' under the changed nomenclature. Later a critical analysis of Pittier's argument by Thothathri revealed

that he was not justified in making the above name change. Though *Deguelia scandens* Aubl. was earlier to *Dalbergia scandens* Roxb., yet the specific epithet *scandens* in the genus *Derris* was occupied (1860) when Pittier (1917) proposed the name *Derris scandens* (Aubl.) for the Guiana plant which is therefore illegitimate. Consequently the new combination *Derris temorensis* (DC.) Pittier var. *saharanpurensis* is also not valid. Hence *Derris temorensis* (DC.) Pittier var. *saharanpurensis* Thoth., a new variety described by the Thothathri (1972) has to be changed.

Desmodium elegans DC. in Ann. Sci. Nat. 4: 100, 1825 (Jan.) et in Prodr. 2: 335, 1825 (Nov.). *Desmodium tiliaefolium* (D. Don) (Wall. Cat. 5707, 1831-32 nom. nud.) G. Don, Gen. Syst. 2: 297, 1832; Schindler in Fedde, Repert. 22: 264, 1926; Baker in Hk. f. FBI. 2: 168, 1876; Collett, Fl. Sim. 132, 1902; S. K. Malhotra in Maharashtra Vidnyan, Mandir, Patrika 6 (1): 40, 1971; *Hedysarum tiliaefolium* D. Don Prodr. 244, 1825 (Feb.).

A large deciduous shrub. Leaves 3-foliate; leaflets variable, ovate, obovate, rhomboid-ovate, 5-2 × 3-5.5 cm, base cuneate or rounded, apex acute, acuminate or obtuse, glabrescent above, silky pubescent beneath. Flowers pale-purple, 10-12 mm long in terminal panicles and axillary racemes. Pods 4-7 × 0.45-5 cm, slightly falcate, 6-9-jointed with minute fine adpressed hairs.

Sahasradhara, along the slopes, S.K. Malhotra 30780.

Fl. Aug.-Oct. Fr. Sept.-Dec.

Distribution:—Throughout the Himalaya ascending to 2700 m.

This species is common in Mussoorie between 1800-2200 m usually in oak forests, Jabbarkhet, Gun Hill etc.

It is very unlikely that it descends as low as Sahasradhara, the base of which lies within the limits of this flora. Almost certainly the specimen collected by Malhotra was from the top of the cliff above 1200 m or so.

Desmodium neomexicanum A. Gray Pl. Wright 1: 53, 1852; Schufert in Contrib. Gray Herb. 129: 13, 1940; Chavan, Sabnis & Bedi in Kew Bull. 17: 265, 1963; Standley & Steyermark in Fieldiana (Bot.) 24: 232, 1946; Maheshwari & Sharma in Bull. Bot. Surv. Ind. 11 (3 & 4): 455, 1969.

A straggling herb, about 30 cm high, branching from base, stem and branches slender, slightly hairy. Leaves trifoliate, greenish, membranous, the terminal largest, ovate-lanceolate. Flowers in axillary and terminal lax racemes or panicles, white with a bluish tinge. Bracts minute, setaceous. Pods 2-3 cm

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long, reticulately veined, indented deeply on both the sutures with the margin sinuate, not spirally twisted, 3-4-seeded.

Happy Valley, Ajmer, *Sharma* 540; Nagpahar, Ajmer, *Sharma* 984; Ambaji, near Mt. Abu, *Maheshwari* 5440. Bundelkhand, *Edgeworth*; Saharanpur, (18th Oct. 1846) *Jameson*; N.W. Provinces, *Royle*.

Fl. Aug.-Oct. *Fr.* Sept. to Nov.

Distribution.—Sabarkantha distr., Gujarat State. Native of tropical America.

Edgeworth's Specimen from Bundelkhand & quoted by *Baker* in *Hk. f. FBI.* 2: 164, 1876 under *D. spirale* DC. is really *D. neomexicanum* A. Gray. *Duthie*, apparently following *Baker*, also made the same mistake and referred *Edgeworth's* specimen under *D. spirale*.

This species can be distinguished from *D. spirale* (Sw.) DC. (= *D. procumbens* (Mill.) Hitch. by the pods which have joints with margins that are merely sinuate, not strongly involute and revolute to give the pod a spirally twisted appearance as in the latter.

Desmodium tortuosum (Sw.) DC. Prodr. 2: 392, 1825; Merr. & Parry in Journ. Arn. Arb. 29: 156, 1948; Van Meeuwen in Reinwardtia 6: 101, 1962; Backer & Bakh. f. Fl. Java 1: 605, 1963. *Hedysarum tortuosum* Sw. Prodr. 107, 1788. *Hedysarum purpureum* Mill. Gard. Dict. ed 8 n 6, 1768 (non *D. purpureum* Hk. & Arn., 1832). *Desmodium stipulaceum* DC. Prodr. 2: 330, 1825. *D. purpureum* (Mill.) Fawcett & Rendle Fl. Jam. 4: 36, 1920 (non Hook. & Arn. 1832).

An erect annual. Leaves 1-3 foliate; petals not winged. Terminal leaflet with a cuneate-obtuse-rounded base, rather acute or obtuse to rounded, 2.5-13 cm by 1.5-7 cm, along the margins rather densely long-hairy, on the lower surface thinly long-hairy. Racemes often combined into a not flat panicle, bracts fugacious. Pedicels 10-15 mm, with many long basally thickened hairs, under the pod erecto-patent to patent; upper segments of calyx connate more than half way up; standard 4-5 mm long, at the base with 2 pale blotches, greenish on the outside; pods 8-30 mm by 4-3.25 mm along both margins about equally deeply (0.25-3.5 of breadth of pod) incised; joints 1-8, 3.5-5 mm long.

North west Provinces, *Royle*; Saharsadhara, common on hill slopes, & naturalized *Raizada*; *S.K. Malhotra* 34816.

Fl. Aug.-Sept. *Fr.* Oct.-Nov.

Distribution.—It is a native of tropical America, introduced in Malasia and now reported for the first time from India.

Malhotra's specimen quoted above slightly differs from typical specimens of *D. tortuosum* in the nature of stipule and leaf base.

The oldest epithet 'purpureum' of Miller is blocked under *Desmodium*.

Indigofera arrecta Hochst. ex A. Rich. Tent. Fl. Abyss. 1: 184; 1847; Baker in Oliver Fl. Trop. Afr. 2: 97, 1871; Haines Bot. Bihar & Orissa 2: 239, 1921; Koorders Exkursians Fl. Java 4 (7): 747, 1926; Hepper in Keay, Fl. W. Trop. Afr. (2nd ed.) 1 (2): 541, 1958; Naresh Bahadur et al. in Journ. Bom. Nat. His. Soc. 70 (3): 497, 1973.

An erect, deep-green undershrub, 1-2 m high with angled and grooved thinly strigose stems. Leaves pinnate, 10-13 cm long with about 7 pairs and 1 odd leaflet. Flowers inconspicuous, pinkish-red, in solitary axillary racemes up to 4 cm long, gradually elongating and becoming double the size but bearing pods only near the base. Pods straight, reflexed, about 2.5 cm long.

Dehra Dun: Chir plantation area, F.R.I., New Forest, T.C. Naithani s.n. New Forest, R. Dayal 490.

Fl. & Fr. Sept.-Feb.

Distribution.—Indigenous to tropical Africa and Java. Cultivated in indigo plantations in Northern India. Now run wild in Dehra Dun.

In passing I would like to mention that Duthie in his Flora (1: 251, 1903) and Rau in his Check List (p. 26) mention that *Indigofera trifoliata* Linn. is found in the region of the Upper Gangetic Plain (Dehra Dun, Saharanpur, Siwaliks etc. Actually the plant which occurs in the area is *Indigofera prostrata* Willd. (*I. trifoliata* Baker in F.B.I. 2: 96, 1876 pro parte.). Actually Gamble has already in his Flora of Madras pointed out and separated *I. prostrata* Willd. from Linne's *I. trifoliata*. *I. prostrata* has long and slender stems, and very thin, almost filiform pods which are so deflexed that they are practically parallel with the stem. *I. trifoliata* has much stouter pods, and their deflexion is never so pronounced as in the former species. The general habit of the former and the stoutness of the latter species render them quite distinct even at first sight in the field.

The specimens from Madhya Pradesh in the Dehra Dun Herb. and identified by Duthie as *I. trifoliata* Linn. are very different both from typical *I. prostrata* and *I. trifoliata* and I suspect they represent a distinct species which I would prefer to name as *Indigofera Duthiei*, Rajzada. Sp. nov.

Indigofera sessiliflora DC. Prodr. 2 : 228, 1825; Ali in Botanisk. Notiser 111 : 549, 1958; Raizada and Sharma in Ind. For. 88(5) : 360, 1962. *Indigofera trigonelloides* auct. non Jaub. and Spach; Baker in Hk. f. FBI. 2 : 94, 1876; Cooke Fl. Bom. Pres. 1 : 312, 1902.

A caespitose annual canescent herb. Stems 15-50 cm long, trailing, angled, mostly adpressed-hairy. Leaves 1.5-5 cm long, 5-8-foliolate; leaflets up to 1.3×0.4 cm, alternate, shortly petioled, oblanceolate or elliptic, mucronulate at apex, adpressedly hairy on both surfaces. Flowers in axillary sessile heads. Pod up to 1 cm long, 3-6-seeded, cylindrical, torulose, acutely pointed at apex, pale-brown, shining, glabrous.

Pushkar, Ajmer distr. V. S. Sharma 1630.

Fl. & Fr. Oct.-Dec.

Gillet in Kew Bull. Add. Ser. 13 (1958) points out that actually the above species occurs in the Indian subcontinent and not *I. trigonelloides*—a species only confined to Ethiopia and South West Africa. Both Baker l.c. and Cooke l.c. have wrongly assigned the Indian plant to *I. trigonelloides* J. & S.

Lotus corniculatus Linn. Sp. Pl. 775, 1753; DC. Prodr. 2 : 214, 1825; Baker in Hk. FBI. 2 : 91, 1875; Mansfeld in Die Kulturpflanze Beih. 2 : 170, 1959; Rangaswami and Chakrabarty in Bull. Bot. Surv. Ind. 8 (1) : 33, 1966.

A perennial herb. Stems slender, glabrous or obscurely silky. Leaflets 5, with end one sessile, the two lowest stipule like. Flowers 4-8 in a close umbel, subtended by a reduced trifoliate leaf at the end of a long peduncle. Calyx 0.5 cm, teeth lanceolate cuspidate. Corolla showy, 2-3 times as long as calyx. Stamens diadelphous. Ovary sessile, many-ovuled; style long, abruptly inflexed. Pod cylindrical, straight, 0.7-3 cm, long.

Shalemar Gardens, Model Town, Delhi, Chakrabarty 462.

Fl. & Fr. July-Aug.

Distribution:—Western Himalaya, as far east as Nepal in the temperate zone, but descending into the plains. Europe, Orient, Abyssenia, Japan, Australia.

Medicago polymorpha Linn. Sp. Pl. 779, 1753. var. *apiculata* (Willd.) van Ooststr. & Reichgelton Act. Bot. Neerl. 7 : 115, 1958. *Medicago apiculata* Willd. Sp. Pl. 3 : 1414, 1803. *M. hispida* Gaertn. f. *apiculata* (Willd.) Urb. in Ver. Bot. Ver. Brandenb. 15:74, 1873. *M. polymorpha* Linn. var. *vulgaris* (Benth.) Shinnars, f. *apiculata* (Willd.) Shinnars in Rhodora 58:

310, 1956. *M. rugosa* auct. non Desvr. 1796. Nair in Journ. Bom. Nat. Hist. Soc. 64: 134, 1967.

Decumbent-ascending, glabrous, annual herbs. Stems 3-gonous, grooved, glabrous or rarely thinly patent-hairy, especially on the younger parts. Leaflets obvate-cuneate, rounded, retuse, mucronate at the apex, dentate at top, glabrous except often hairy nerves beneath, $0.5-1 \times 0.3-0.5$ cm, terminal leaflet on a $0.2-0.3$ cm long petiolule; petiole $0.6-1$ cm long; stipules ovate-lanceolate, laciniated with subulate segments, glabrous or laxly hairy. Flowers yellow, 2-4 on a slender axillary peduncle; peduncles glabrous, $0.5-1$ cm long; bracts subulate, $0.03-0.05$ cm long. Calyx 0.2 cm long, hairy at the top, lobes lanceolate, acuminate. Corolla yellow, exceeding the calyx, $0.25-0.28$ cm long. Pod coiled 2-3 times, unarmed, reticulate-venose, conspicuously so along the dorsal suture, glabrous, $0.4-0.45$ cm across.

Kalsi, near Ashoka Pillar, Dist. Dehra Dun Raizada 79873. Rohilkhand, T. Thomson 458; Dehra Dun, Surindra Singh 3, not uncommon in lawns, gardens and agricultural fields; Dehra Dun, N.P. Singh 35477, 31671, abundant in Sugarcane fields.

Fl. Feb.-April. Fr. March-April.

Distribution: A native of Europe, now found in the plains of the Punjab (Ferozepore).

Nair (loc. cit.) recorded it for India from the plains of Punjab under the erroneous name *M. rugosa* Desvr. (= *M. elegans* Jack. ex Willd.). However, a critical study of his specimen lodged in the herbarium (BSD) as well as plants from Dehra Dun shows that they neither agree with the description nor comparable to authentic specimens of *M. rugosa* Desvr., which is a native of Europe and is characterised by glandular-pubescent stems and petioles, pubescent peduncles and calyx, appressed-hairy lower leaf surface and larger pods with conspicuously raised reticulations of the dorsal surface, but will cover the characters and match exactly with authentic specimens of *M. polymorpha* Linn. var. *apiculata* (Willd.), which is also a native of Europe, and is easily differentiated from *M. rugosa* by glabrous parts, shorter pods, less conspicuous reticulations of the dorsal suture.

Phaseolus mukerjeanus Babu, Sp. nov. (MS.) ex Raizada.

Slender, annual, hirsute, herbaceous twiners. Stems, petioles and peduncles patent-brown hairy. Leaflets short-petioluled on $0.3-0.4$ cm long petiolules, ovate-lanceolate-oblong, acute-acuminate, attenuate towards the apex, rounded or cuneate at base, faintly 3 lobed, hairy $6-7$ $(-8) \times 2-3.5$ cm; stipels linear-subulate $0.3-0.4$ cm long; petiole $4-5$ (-6) cm long or little more;

stipules falcate-lanceolate-linear, 0.5-0.6 cm long. Flowers yellow in dense, long peduncled, axillary racemes, peduncle 6-8 (-10) cm long or more, tubercles 2-4, pedicels 0.3-0.4 cm long; bracts lanceolate-linear; bracteoles linear-lanceolate, 0.6-0.7 cm long. Calyx 0.2-0.35 cm long, lower teeth acute, upper teeth connate into a 2 suborbicular, wings spurred at the base; stamens 2-adelphous, ovary sessile, style flattened upwards, bearded at the top, prolonged beyond the oblique stigma into a beak. Pod subterete, quite glabrous, 12-14 seeded, 7-8 cm long; seeds dark brown, mottled with black blotches, with truncate ends and centric hilum (0.25×0.2 cm).

Robber's Cave, C.R. Babu 35405 (holotype BSD). Not common, sal-forest, hill slopes and scrub jungles.

Fl. & Fr. Sept.-Nov.

The specimen is closely allied to *P. pubescens* Bl. (= *P. calcaratus* Roxb.) but is easily distinguishable by very dense short racemes, brown hairy stems, petioles and peduncles, shorter calyx, shorter corolla and shorter and narrower stipules. It is also similar to *P. scaberulus* Miq., a Malesian species, but this can be distinguished from it by bracteoles which are longer than the calyx and longer and almost always glabrous pods. This is one of the two wild forest species of this area and may be a progenitor of cultivated *P. pubescence* Bl. It may be pointed that this may be useful in the gene-pool for the breeding programme of cultivated species.

This plant is dedicated to Dr. S.K. Mukerjee in recognition of his valuable contribution to Botany.

Phaseolus subramanianus Babu, Sp. nov. (MS.) ex Raizada. *P. calcaratus* auct. non Roxb. 1832; Haines, Bot. Bih. & Oris. 2: 288, 1922. *P. sublobatus* auct. non Roxb. 1832. Duthie FUGP. 1: 226, 1903.

Slender, hirsute, annual, herbaceous twiners. Stems, petioles and peduncles densely reflexed, brown hairy or bristly, often suffused with purple, terete. Leaflets short petioluled, broadly ovate-rhomboid, oblong, shortly acuminate, terminal one cuneate at base, lateral ones subtruncate, subentire-repand, faintly or shallowly 3-lobed, appressed-long-grey hairy, 8-10 (-12) \times 5-6 (-8) cm; stipules 0.4-0.7 cm long, linear-subulate; petiole 6-10 (-12) cm long; stipules oblong obovate 1-1.5 \times 0.45-0.5 cm, 15-16-nerved, often suffused with purple. Flowers yellow 0.7 cm across, in dense, long-peduncled racemes; peduncle 3-15 cm long; tubercles few; flower bearing rachis up to 3 (-4) cm long, bracts ovate-lanceolate, 0.5-0.6 \times 0.22-0.24 cm; bracteoles lanceolate, acute 0.3-0.4 cm long. Calyx 0.2 cm long, upper teeth shortly connate, teeth ovate-triangular 0.05-0.07

cm long. Corolla 0.6-0.8 cm long, standard pale yellow with reddish-purple streaks 0.5-0.8×0.8-1 cm, wings falcate oblong, keel pinkish, stamens 2-adelphous; ovary sessile, style 0.6 cm long, bearded near the top, stigma oblique. Pod terete, recurved at the top, 6-12 seeded, minutely appressed, grey hairy (setulose) 3-4.5 (-5) cm long, erecto-patent; seeds dark grey or brownish with truncate ends, 0.2×0.15-0.18 cm.

Fl. & Fr. Sept.-Nov.

Dehra Dun, Rispana, C.R. Babu 34061 (holotype BSD).

Common; sal-forest, forest-clearings and forest edges,

This species is closely allied to *P. sublobatus* Roxb. in its vegetative features, but is easily distinguishable by minutely appressed-short-grey-hairy pods, smaller corolla, shorter calyx and longer floriferous rachis; also superficially resembles *P. pubescence* Bl., but can be readily distinguished from it by larger oblong-obovate stipules, short floriferous rachis, shorter flowers, shorter and puberulous pods. *P. mukerjeanus* Babu ex Raizada also shows some similarity to this but the former is characterised by narrower leaflets, shorter and lanceolate-linear stipules, shorter flowers, longer bracteoles and perfectly glabrous pods. A critical study of the material of both *P. pubescence* Bl. (= *P. calcaratus* Roxb.) and *P. sublobatus* Roxb. shows that this species was wrongly identified as *P. calcaratus* and sometimes as *P. sublobatus* Roxb. in the past. Haines (loc. cit.) treated this plant as *P. calcaratus* Roxb. with a note that "it is doubtfully Roxburgh's plant which has quite glabrous pods." The description given by Duthie (loc. cit.) under his *P. sublobatus* seems to well cover all the characters of this remarkable plant.

This is another forest-species of the genus from this area, and may be useful in the gene-pool for breeding purposes.

This interesting taxon is named after Dr. K. Subramanyam who enriched Indian Botany with his valuable contributions.

Psoralea plicata Delile, Fl. Egypt. 250, t. 37, fig. 8, 1812; DC. Prodr. 2: 221, 1825; Baker in Hk. f. FBI. 2: 103, 1875; Raizada in Journ. Ind. Bot. Soc. 14 (4): 149, 1935.

A low copiously-branched undershrub 2-5 cm high. Leaves trifoliolate. Racemes short-peduncled, 5-9 cm long. Flowers yellow. Calyx clothed with adpressed white hairs, accrescent, clasping tightly the included pods. Pod 1-seeded, indehiscent, densely hairy.

Ajmer, A E. Laurie; Railway choki, Karnal Road, Delhi, Chakrabarty.

Fl. April.

Distribution.—Plains of the Punjab, (Hissar, etc.) common in arid places. Pakistan, Arabia, Egypt, Tropical Africa. Camels are very fond of this plant.

Rhynchosia minima DC. Prod. 2: 385, 1825 var. *laxiflora* Baker in Hk. f. FBI. 2: 223, 1875; Murty & Singh in Proc. Nat. Inst. Sc. Ind. 27: 15, 1961.

A twing glabrous herb; leaflets larger 4-9 cm long, acute, both the upper and lower subdeltoid; racemes lax 5-10 or even 18 cm long.

Hastinapur, *Bhatia* 252; Pandav Block, Hastinapur, *Murty & Singh* 282.

Tephrosia falciformis Ramaswami in Journ. As. Soc. Beng. 12: 125, 1916; Raizada and Sharma in Ind. For. 88 (5): 360, 1962.

A perennial low branched shrub 3-10 cm high, Branches angular, densely pubescent. Leaves 6-12 cm long, imparipinnate. Leaflets 5-17, narrowly oblanceolate or oblong, mucronate, sometimes also emarginate; lateral leaflets 2.5-4.5 × 3-8 cm, terminal 3-5 × 0.5-1.5 cm. Racemes terminal, 10-30 cm long; flowers lax; corolla purple-red. Pods distinctly falcate, circinate, softly pubescent all over.

Pushkar, Ajmer distr. *V.S. Sharma* 471, Budha Pushkar, *V.S. Sharma* 1029.

Fl. & Fr. Aug.-Sept.

Around Pushkar it forms pure communities on sand dunes.

Tephrosia hamiltonii J.R. Drumm. in Gamble, Fl. Madras 2. 318, 1918; Osmaston For. Fl. Kumaon 155, 1927; Raizada in Journ. Ind. Bot. Soc. 14 (4): 149, 1935. *S. purpurea* Baker in Hk. f. FBI. 2. 112, 1875 *ex parte*.

An erect deciduous undershrub 3-8 cm high with a woody basal portion. Stems angular, somewhat zigzag, more or less densely pubescent. Leaves 5-14 cm long; leaflets 7-17, oblanceolate-oblong, 0.2-3 cm long, usually retuse at the apex, mucronate, minutely adpressed hairy above, silky pubescent beneath, entire. Flowers 1-15 cm long, rose-coloured or bright pink, in fascicles or pairs on the rachis of terminal or leaf-opposed racemes 2-20 cm long; pedicels usually much exceeding the linear-subulate bracts. Calyx and back of standard puberulous, remainder of corolla glabrous. Pod 2-4 cm long, somewhat curved near the tip. Seeds 4-7, pale brown mottled darker.

Ramnagar, *Hole* Dehradun Herb. No. 1222; Haldwani div., U.P., *Osmaston* 1247.

Fl. June-Aug. *Fr.* Jan.-Feb.

This species differs from *T. purpurea* mainly by its more erect habit, angled silky or villous branches and larger flowers.

Tephrosia pauciflora R. Grah. ex Baker in Hk. f. FBI. 2: 114, 1875.

A prostrate herb about 13 cm; stem densely caespitose. Stipules ascending, setaceous. Leaflets 5-9, narrow, oblanceolate, finely silky beneath, 2.5-4 cm long, often emarginate. Flowers usually all geminate on short pedicels in the axils of upper leaves. Calyx finely silky; corolla red, twice the size of calyx-tube; stamens 10, diadelphous, uniform. Pod 2.5-5 cm, beaked, brown. Seed many.

Mehrauli, Delhi, *Chakrabarty* 469.

Fl. & Fr. August-Sept.

Distribution:—Plains of Sindh, Punjab, Burma.

Tephrosia uniflora Pers. subsp. *petrosa* (Blatt. & Hall.) Gillet & Ali in Kew Bull. 114, 1958; Raizada & Sharma in Ind. For. 88 (5): 360, 1962. *Tephrosia petrosa* Blatt. et Hall. in Journ. Bom. Nat. Hist. Soc. 26: 239, 1918.

A suffruticose perennial with 20-60 cm long trailing branches. Stems slender, angled adpressedly grey-pubescent. Leaves 3-8 cm long; leaflets 5-7 rarely 3. Flowers solitary axillary or often two together. Calyx 3-4 cm long, subulate; the tube more or less equalling the saccate lobes. Corolla red-purple, gland-punctate. Ovary densely hairy. Style glabrous, compressed; stigma knobbed, with few hairs. Pods 3-5 cm long.

Nagpahar Mt., Ajmer Distr. *V. S. Sharma* 968; Srinagar Ghate, Ajmer District, *V. S. Sharma* 1014.

Fl. Aug.-Sept. *Fr.* Sept.-Nov.

Distribution:—Rajputana.

Trifolium alexandrinum Linn. Cent. Pl. 1: 25, 1755; Hossain in Notes Roy. Bot. Gard. Edinb. 23: 425, 1961; Bailey Man. Cultiv. Pl. 581, 1949.

An annual, 30-60 cm tall. Leaves digitately 3-foliate; leaflets oblong, obtuse, 3-4 × 1 cm. Flowers greenish yellow, in dense, globular or ovate-oblong, about 2 × 1.5 cm heads. Bracts forming involucre at base. Calyx teeth long-subulate.

Rispana, Dehra Dun, *C.R. Babu* 35099.

Fl. & Fr. March-May.

Distribution:—The 'Berseem' is a native of Egypt & Syria.

Cultivated for use as fodder, often met with as escape on agricultural fields and waste places.

Trifolium resupinatum Linn. Sp. Pl. 771, 1753; Hossain in Notes Roy. Bot. Gard. Edinb. 23: 465, 1961; Baker in Hk f. FBI. 2: 86, 1875; Gleason in new Britton & Brown Illust. Fl. North-Eastern United States and adjacent Canada 2: 401, 1902; Murty & Singh in Proc. Nat. Inst. Sc. India 27 (1): 14-15, 1961.

A slender erect herb with narrowly obovate leaflets. Flowers in dense racemose heads. Calyx teeth 5; inflated in fruit; petals pink, persistent, wings longer than keel, the claws of both adnate to the staminal tube. Upper stamens free, all or 5 of the stamens dilated at the top. Pod small, 1-6-seeded, indehiscent, enclosed in the calyx and often covered by the persistent standard.

Meerut, Murty & Singh 777; Rispana, Dehra Dun C.R. Babu 35246, 35098. Naturalized in waste places, road-sides, agricultural fields and grassy localities in Dehra Dun.

Fl. & Fr. Feb.-March.

Distribution.—A native of Europe, cultivated in Afghanistan, Hazara and Khagan. Its occurrence in Meerut is a mystery although according to Murty & Singh (Proc. Nat. Inst. Sc. Ind. 27: 14, 1961) "it is being collected for the last three years and is now becoming established in the lawns of Botanical Garden, Meerut College, Meerut."

Trifolium tomentosum Linn. Sp. Pl. 771, 1753; Hossain in Notes Roy. Bot. Gard. Edinb. 23: 453, 1961; Babu in Ind. For. 95(2): 102, 1969.

A diffuse annual herb. Stem subterete, striate, decumbent below, ascending upwards. Petiole 0.2-0.8 (-1.0) cm long; lower leaves long-petioled, upper short-petioled; leaflets subsessile, 1.5-2 × 1-1.5 cm or smaller, obovate, rounded-subtruncate, cuneate, acute at base, retuse at apex, acutely denticulate-dentate, often suffused with purple along the margins. Stipules 1.3-1.5 cm long, lower halves scarious and adnate to the petiole, upper halves 0.7-0.8 cm long, free, herbaceous, ovate-lanceolate, acuminate. Flowers sub-sessile, in axillary, globose peduncled heads 0.5-0.7 cm across; peduncles 0.8-1.2 cm long, shorter than the subtending leaves, recurved in fruit. Calyx 0.25-0.3 cm inflated on the upper side after anthesis; upper 2 calyx-teeth subulate, connate at the base; lower 3 lanceolate, acute, 0.1-0.13 cm long, densely hairy at back. Corolla purplish, 0.4-0.45 cm long, macroscent, resupinate, standard obovate, shallowly notched. Style glabrous. Pod ovoid-ellipsoid, 2-seeded, included within the fruiting calyx, fruiting calyx 0.4 × 0.28-0.35 cm, glo-

bose, inflated, membranous, densely hairy on the upper side, with upper calyx-teeth bent inwards and hidden.

New Forest, Dehra Dun, K.M. Vaid Dehra Dun Herb. No. 142362, 142363.

Robber's Cave, Dehra Dun C.R. Babu 35055; New Forest, Dehra Dun, H.B. Naithani 6560. A common weed of cold weather, and usually found in fallow lands, dry rice-fields, waste grounds and along road-sides.

Fl. & Fr. Nov.-March.

Distribution:—A native of Europe now naturalised in Dehra Dun.

This species is closely allied to *T. resupinatum* L., but can be distinguished in that in *T. tomentosum* the peduncles are shorter than the subtending leaves while in *T. resupinatum* the peduncles are longer than the subtending leaves. More over the inflated part of the calyx in the two species is different. Furthermore the leaflets are acutely denticulate-dentate in *T. tomentosum* while in *T. resupinatum* they are acutely serrulate-serrate.

Apparently this species must have been introduced into this country in the last century as there is a sheet of this species in the Dehra Dun Herb. presented by Dr. King as early as 1882.

Trigonella incisa Benth. in Royle, Ill. 197, 1835; Kitamura Fl. Afgh. 213, 1960; Maheshwari Fl. Delhi 115, 1963.

A slender, prostrate, suberect or diffuse annual. Leaflets obovate, sharply incise-dentate in the upper half. Flowers yellow. Pods 3.5×0.2 cm, sickle-shaped, flat.

Found as a winter weed in fields in Delhi, J. K. Maheshwari 617.

Fl. & Fr. Dec.-March.

Kitamura (loc. cit.) adopted *T. incisa* Benth. (l.c.) for this Indo-Afghanistan plant, based on Vass. (Fl. et Syst. 10: 225, 1953) observations, who maintained both *T. incisa* Benth. and *T. polycerta* L. as distinct species, and adopted the former for the Indo-Afghanistan plant and the latter to the European plant. Maheshwari (loc. cit.) following this treatment, treated the Indian plant under *T. incisa* Benth. I, however, following Baker (in Hk. f. FBI. 2. 87, 1876) prefer to treat this plant as *T. polycerta* Linn.

Vicia tetrasperma (Linn.) Moench. Meth. 148, 1794; Boiss. Fl. Orient. 2: 569, 1849; Baker in Hook.f. Fl. Brit. Ind. 2: 177, 1879; Collett, Fl. Siml. 135, 1902; Haines, Bot. Bihar and Orissa, Repr. ed. 2: 260, 1961; N.P. Singh in Bull. Bot. Surv.

India 5 (3 & 4): 334, 1963. *Ervum tetraspermum* Linn. Sp. Pl. 738, 1753; DC. Prodr. 2: 367, 1825.

An annual climbing herb. Stem copiously branched, slender, zig-zag, green, quadrangular and glabrous. Leaves alternate, 2-4 cm long, rachis ending in a tendril, petiole 2-3 cm long. Stipules 2, opposite, acute, base prolonged below the attachment in a pointed lobe, 2-3 mm long; leaflets 6-10, opposite, or subopposite, 8-15 × 2-3 mm, narrowly oblong, entire, mucronate, glabrous; veins prominent on the abaxial surface; petiolules pubescent, 1 mm long. Peduncles about as long as the leaves with a joint slightly below the flower base, decurved in fruit; flowers solitary (Baker loc. cit. says 1-2-flowered), axillary, ± 2 mm long, bell-shaped, 5-toothed, the 3 anterior sepals larger than the rest. Corolla papilionaceous, distinctly exserted, light blue, 3 mm long; standard broad, erect; keel jointed. Stamens 10, 9 united and forming a tube, filaments glabrous, ± 3 mm long. Ovary glabrous, 4-ovuled, 3 mm long; style incurved, cylindrical, bearded at the top, ± 1 mm long, persisting in fruit. Pods oblong, ± 1.3 cm, glabrous, 3-4-seeded. Seeds black, nearly spherical, glabrous.

New Forest, Dehra Dun *H.B. Naithani* s.n.; *Raizada*, s.n.; Niranjapur Tea Estate, Dehra Dun, *N.P. Singh* 25485; Rispana, Dehra Dun *C.R. Babu* 35048.

Fl. & Fr. Jan.-May.

Distribution:—North-West Himalaya, Kumaon; Europe, Orient.

CAESALPINIACEÆ

Caesalpinia digyna Rottl. in Ges. Natur. Fr. Neue. Schr. 4:200, 1803; DC. Prodr. 2: 482, 1825; Baker in FBI. 2: 256, 1878; *Raizada* in Proc Nat. Inst. Sci. Ind. 24 (4): 200, 1958.

A large much branched prickly straggling shrub. Leaves up to 30 cm long; leaflets close, oblong obtuse, sessile. Flowers bright pale yellow, 1.5-1.8 cm across, in supra-axillary racemes which are 7-20 cm long. Pod 2-4.6 cm long, oblong, thick, fleshy, crowned by the long persistent style.

Domakhand, Gorakhpur, *Sri Ram* 937.

Fl. & Fr. Cold season.

Distribution:—Eastern Himalaya, Eastern & Western Peninsula, Ceyon, Malaya.

Cassia laevigata Willd. Enum. Hort. Berol. 441, 1809; Prain in Journ. As. Soc. Beng. 66: 476, 1897; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 180, 1968.

An erect or often bushy shrub, up to 2.6 m high. Leaflets 3-4 pairs, ovate, ovate-oblong or ovate-lanceolate, 4.5-11 cm long, acuminate, glabrous; rachis bearing a gland between each pair of leaflets except the terminal one. Flowers in axillary or terminal racemes. Petals yellow, about 1.2-2 cm long. Stamens 7; staminodes 3. Pods cylindric, 8-10 cm long, glabrous.

Robber's Cave, Dehra Dun *Som Deva* 2771.

Fl. July-Sept. *Fr.* Oct.

Distribution:—W. Himalaya; South Indian Hills; Khasi hills; Sikkim. Widely distributed in the world. It is a native of tropical America.

Cassia roxburghii DC. Prodr. 2: 489, 1825; de Wit in Webbia 11: 226, 1955. *Cassia marginata* Roxb. Fl. Ind. 2: 338, 1832; Baker in Hk. f. FBI. 2: 262, 1878.

A small tree, 3-6 m high, with spreading branches. Leaves 10-20 pairs; leaflets unequal-sided at the base, rounded or emarginate, apiculate at apex, densely yellow pubescent when young, minutely pubescent above and silky beneath when old; flowers in axillary and terminal racemes, on fresh branches. Pods often curved, torulose.

Cultivated in garden as an ornamental plant.

Fl. Nov.-Feb. *Fr.* March-Oct.

Distribution:—Native in South India and Ceylon. Introduced in Malaya

Cassia siamea Lamk. Enycl. 1: 648, 1788; Baker in Hk. f. FBI. 2: 64, 1878; de Wit in Webbia 11: 263, 1955.

A middle-sized tree, 6-12 m high. Leaves with 6-10 pairs of leaflets, leaflets 2.5-5 cm long, oblong, emarginate at apex with a small sharp mucro, glabrous. Flowers yellow in corymbose terminal paniced racemes. Pods 15-22 cm long, flat, many-seeded.

A fast growing species commonly planted along road sides and avenues; a good shade tree.

Fl. Sept.-May.

Distribution:—Native of S.E. Tropical Asia. Elsewhere only cultivated.

Hardwickia binata Roxb. Pl. Cor. 3: 16, t. 209, 1811; Baker in Hk. f. FBI. 2: 270, 1878.

A large deciduous tree, with drooping branches. Leaves with two distinct leaflets; leaflets 2.5-4.5 cm long, sessile, obliquely rhomboid or ovate-obtuse, glabrous. Flowers yellowish-

white, in axillary and terminal panicked racemes. Pods 4.5-7.2 cm, samaroid, linear oblong, one seeded.

Hathinala, Mirzapur, U.C. Bhattacharya 18392.

Fl. & Fr. July-Aug.

Distribution:—Bihar, Orissa and Western Peninsula.

MIMOSACEÆ

Acacia auriculiformis A. Cunn. in Hook. Lond. Journ. Bot. 1: 377, 1842.

A middle-sized tree. Phyllodea curved, coriaceous, parallel nerved, tapering at the ends. Flowers yellow, in cylindrical, lax spikes. Pods moniliform, brown, coiled at maturity, dehiscent. Seeds black with long, coiled, orange-yellow funicle.

Cultivated in lawns and as avenues especially in New Delhi for its graceful, pendent phyllodes and beautiful flowers.

Fl. Oct. Fr. Aug.-Nov. (next year).

Distribution:—A native of Australia.

Acacia donaldii Haines in Ind. For. 43: 88, 1917; Raizada in Journ. Ind. Bot. Soc. 14 (4): 151, 1935.

A small tree (?) up to 6 mm in girth, very rarely subscandent. Branches with usually 5 lines of minute prickles; twigs finely pubescent, usually armed with short recurved prickles but stipular spines absent or rudimentary. Leaf-rachis 9-27 cm, usually 10-18 cm, with very short swollen petiole and a flattish or rudimentary gland on rachis immediately above it and between each of the 3-4 upper pinnae, rachis with very small weak prickles on the lower rounded surface. Pinnae 10-27 (usually 16-20) pairs, 1-2 cm apart and extending down the rachis to within 1.2 cm of the base of petiole, median 3-5 cm long with 25-40 rarely 50 pairs of linear leaflets 1-1.5 cm long. Flower heads white or cream coloured about 1.2 cm diameter on peduncles 1.5-2 cm long, usually 3-nate in the axils of bracts. Calyx glabrous, 5-nerved with acute lobes. Corolla free from calyx, glabrous about 2 cm long. Stamens very shortly connate at extreme base and also adnate to base of corolla; ovary sericeous with long stipes 2 cm long. Pods green to pale yellow and whitish-brown, ultimately grey, rather turgid when unripe up to 8 cm thick.

Saugor, D. O. Witt.

Fl. Aug.

Distribution:—Bihar.

The generic name *Acacia* is usually attributed to Willdenow in our floras. According to Rothmaler in Fedde Repert. 53: 2, 1944 the author is Guettard (1753), Miller (in Gard. Dict. Abbrev. Edit. 4, vol. 1, 1754) used it in 1754, Adanson in 1763; Willdenow in 1806.

Incidentally the correct spelling of *Albizia*, Durazz's genus is (with a single Z) *Albizia* not *Albizzia* as generally used in all our floras, cf. Lawrence in Gent. Herb. 8: 44-45, 1949.

Acacia ferruginea DC. Prodr. 2: 458, 1825; Baker in Hk. f. FBI, 2: 295, 1878; Raizada in Journ. Ind. Bot. Soc. 14 (4): 150, 1936.

A middle-sized tree with rough grey bark, 6-10 m high. Spines stipular, dark brown, sometimes absent. Rachis with one gland towards the base and one between the uppermost pinnae; pinnae 2-5 pairs; leaflets 10-20 pairs, 1-1.5 cm long. Spikes dense, 7-10 cm long. Corolla yellow. Pod straight, flat, thin, glabrous, indehiscent, upper suture narrowly winged, 10-12 cm long.

Donda forest, Banda, *Divisional Forest Officer*.

Fl. March-April. Fr. Nov.-Jan.

Distribution.—Western Peninsula, N. Circars, Deccan and Carnatic in dry forests.

Acacia gageana Craib, in Kew Bull. 1915: 409, 1915.

A large prickly scrambling shrub; young shoots, petioles and inflorescence more or less pubescent, older stems fluted and angled. Leaf-rachis 15 cm long, with a sessile gland near the base and often similar glands between the upper 1-3 pairs of pinnae. Stipules linear, caducous; pinnae 7-14 pairs, 5-10 cm long; leaflets usually 15-30 pairs, glabrous and shining above. Panicle large, terminal. Flowers pale creamy-white, in globose, pedunculate heads 0.3-1.3 cm diameter, glabrous; peduncle 1.2-1.8 cm long, generally 1-3-nate. Pod 12-15 cm long, strap-shaped, finely pubescent when young, glabrous when mature, brown.

Saharanpur Siwaliks and in ravines near Dehra Dun, eg. Kalsi, Kusumri etc. Also occurs in Pilibhit (*P.C. Kanjilal*) and Hastinapur according to *Murty & Singh*.

Fl. Aug.-Sept. Fr. Dec.-April.

This species can easily be distinguished from *A. torta* Craib by the leaflets which are glabrous on the upper surface and by the glabrous flower heads. Furthermore the petiolar glands are flat or convex in *A. gageana* while they are conical in *A. torta* Craib (= *A. caesia* W. & A. non Willd.).

Acacia lenticularis Ham. ex Baker in Hk. f. FBI. 2: 296, 1878; Raizada in Journ. Ind. Bot. Soc. 14 (4): 150, 1935; Osmaston For. Fl. Kumaon 167, 1927.

A medium-sized tree. Branches armed with pairs of slightly recurved compressed stipular spines. Rachis 10-17.5 cm long with a gland below the pinnae. Pinnae 2-5 pairs, 5-12.5 cm long. Leaflets 6-12 pairs, $2.2.8 \times 1.5-2$ cm (much larger than in any other species). Flowers white in dense pedunculate axillary spikes 7.5-12.5 cm long. Pod flat, straight, $10-22.5 \times 2.5-4$ cm, glabrous; seeds 4-8.

Pilibhit, Sri Ram Dehra Dun Herb. No. 52627; Jaulasal, Haldwani Div., A.E. Osmaston 1275.

Fl. April-May. Fr. cold season.

Distribution:—Foot of Central and Eastern and Western Himalayas.

Acacia pseudo-eburnea J.R. Drumm. in Kew Bull. 1922: 185, 1922; Osmaston For. Fl. Kumaon 196, 1927. *A. eburnea* (L.f.) Willd. Sp. Pl. 4: 1081, 1806; Baker in Hk.f. FBI. 2: 293, 1878 (pro parte); *Mimosa eburnea* Linn. f. Suppl. 437, 1781, non Roxb.

A small deciduous tree with rough dark-grey bark; spines straight, generally dark-brown and about 2 cm long, the larger ones white and up to 5 cm long. Leaves 2.5-3.2 cm long; pinnae usually 4 pairs, the uppermost pair with a large gland at the insertion besides often a second one below the lowest pair. Leaflets 6-12 pairs, oblong, 3-4 mm long. Flowers pale-yellow, in axillary globose heads; peduncle 2-5 cm long, filiform, with an involucre of connate bracts from the base. Calyx funnel-shaped. Corolla about twice the length of the calyx, rose-purple. Stamens yellow. Pod 5-10 cm on the same peduncle, narrow-linear, flat, stalked, rigidly coriaceous, glabrous shining, slightly contracted between the seeds.

Common in the Saharanpur Siwaliks, generally in beds of ravines where it is associated with 'Khair.' Also found in Dehra Dun & Saharanpur; also in the sub-Himalayan tract and outer ranges of hills up to 1200 m of Kumaon.

Fl. Cold season, rarely March-April. Fr. about 4 months after flowering, generally April-May.

Distribution:—The Plains, Salt Range and sub-Himalayan tract from Jhelum west-wards.

Mimosa himalayana Gamble in Kew Bull. 1920: 4, 1920. *M. rubicaulis* sensu Baker in FBI. 2: 291, 1878, pro-parte non Lamk.

A large, straggling prickly, shrub. Young branches red, closely ribbed, thickly beset with short recurved prickles. Leaves

bipinnate, 10-15 cm long, pinnae 8-12 pairs, leaflets 16-20 pairs, oblong, 2.5-7 mm long, unequal-sided, obtuse, mucronate. Flowers pink, fading to white, tetramerous, in globose pedunculate heads, peduncles in axillary fascicles, forming larger terminal leafy panicles; stamens 8. Pods falcate, 7.5-10 cm long, 1-1.2 cm broad, glabrous with 4-10 joints, remaining long on the plant.

Common in grasslands and fallows in the Dehra Dun and in rau-beds in Saharanpur Siwaliks; also common in scrub forest of sub-Himalayan tracts of Kumaon.

Fl. July-Sept. *Fr.* Nov.-Jan.

Distribution:—Throughout India ascending to 1500 m, Afghanistan.

Prosopis glandulosa Torr. Ann. Lyc. N. York, 2: 192, t.2, 1828.

A small medium-sized deciduous tree; branches long, zig-zag, straggling or pendulous, armed with scattered axillary stout subulate thorns, 1-5 cm long. Rachis 2.5-12 cm long, slender, terete, prolonged beyond the last pinnae, as a soft bristle, swollen and glandular at the base. Pinnae usually 1 sometimes 2 pairs, 7-12 cm long, often glandular between the leaflets. Leaflets 10-18 pairs, 2-4 cm long, 0.5-1 cm broad, rather distant, linear-oblong, falcate, usually acute, midrib almost central, subsessile. Flowers creamy-white in axillary pedunculate spikes about 8 cm long. Calyx campanulate, 5-toothed. Petals oblong about 2 mm long, oblong. Pods 12-20 cm, linear, straight or falcate, compressed, turgid, pendulous, distinctly constricted between the seeds when fully ripe, pulpy; seeds 12-20, ovoid, compressed.

Naturalized in the dry parts of Punjab and on the Ridge at New Delhi, *Raizada*.

Fl. & Fr. April-June.

Distribution:—Indigenous to Southern United States and North Mexico.

Prosopis chilensis (Molana) Stuntze (= *P. juliflora* (Sw.) DC.) is also extensively planted on the ridge in New Delhi and elsewhere (*Raizada & Chatt.* in Ind. For. 80: 677, 1954).

ROSACEÆ

Agrimonia eupatorium Linn. Sp. Pl. 1: 448, 1753; Hk. f. in FBI. 2: 361, 1878; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 180 1968.

A herb 30-90 cm high. Leaves pinnate, lower larger; leaflets very unequal, toothed, larger ones ovate, obovate or

lanceolate, intermixed with a number of much smaller ones. Flowers yellow, 6 mm across, in terminal spike-like racemes. Calyx-tube top-shaped, grooved, bearing outside its mouth a ring of small hooked bristles; limb 5-lobed. Achenes 1 or 2, enclosed in the hardened bristly calyx, crowned with a ring of hooked bristles.

Sal forest Rajpur, *Raizada*; Rajpur Sal forest, *Som Deva* 2910, in sunny situation on the fire line.

Fl. July-Aug. *Fr.* Sept.

Distribution:—Temperate Himalaya from Murree and Kashmir to Sikkim, 2100-3000 m, Khasi Hills.

Potentilla sundaica (Bl.) Ktze. Rev. Gen. Pl. 1: 219, 1891; Backer & Bakh. f. Fl. Java 1: 518, 1963. *Fragaria sundaica* Bl. Bijdr. 1106, 1826-1827; *P. kleiniana* Wight Ill. t. 85, 1831; W. & A. Prodr. 300, 1834; Hk. f. in FBI. 2: 359, 1878; *Raizada* in Journ. Ind. Bot. Soc. 14 (4): 151, 1935.

A slender prostrate sparsely silkily hairy annual; leaves digitately 3-5-foliolate; leaflets 5, narrowly ovate, serrate, stipulate. Flowers small about 2 mm in diameter, in terminal panicked cymes. Achenes minutes, deeply wrinkled.

Dehra Dun, *B.L. Gupta* Dehradun Herb. No. 46135. Rispana, Dehra Dun *C.R. Babu* 32005; New Forest, Dehra Dun *Raizada* s.n.; *H.B. Naithani* 6598.

Fl. & Fr. March-June.

Distribution:—Temperate Himalaya from Kashmir and Sikkim, Bhutan, Khasia Mountains, Nilgiris-Coylon, Yunan, Java, Japan.

Pygeum acuminatum Colebr. in Trans. Linn. Soc. 12: 300, t. 18, 1819; Hk. f. in FBI. 2: 318, 1878; Osmaston For. Fl. Kumaon 204, 1927; *Raizada* in Journ. Ind. Bot. Soc. 14 (4): 151, 1935.

A small evergreen tree with elliptic or ovate-oblong, entire leaves, 10-15 cm long. Flowers yellowish-green in axillary tomentose racemes 5-9.8 cm long. Calyx campanulate. Petals 6, clawed, ovate, villous. Stamens 30-40; ovary glabrous, style slender. Drupe transversely oblong about 1.2-1.4 cm with a shallow median furrow, somewhat woody.

Baargot Nalla, Haldwani division, *Champion*, Dehradun Herb. No. 25194.

Fl. August. *Fr.* April-June.

Distribution:—Eastern Bengal, Khasi Mountains, Bangladesh.

Rosa brunoni Lindl. Ros. Monog. 120, t. 14, 1820; *Rosa mcschata* J. Hermann Diss. de Rosa 15, 1762; Hk. f in FBI. 2: 367, 1878; Raizada in Ind. For. Rec. (n.s.) Botany 4 (3): 66, 1950.

A large climber with recurved prickles on twigs. Leaves imparipinnate; leaflets 5-9, ovate, ovate lanceolate, 2-8.5 cm long, serrate, acuminate. Flowers white 2.7 (-5) cm across, in large terminal corymbs. Calyx-lobes lanceolate, entire, at times pinnatifid, reflexed in flower. Fruit dark-brown, globose or ovoid, 8-14 mm long.

Rajpur, climbing over shrubs, *Raizada* Dehra Dun Herb. No. 59335; Near Chandbagh, Dehra Dun, *Raizada*.

Fl. April-May. *Fr.* Oct.-Feb.

Distribution.—Temperate Central & Western Himalayas, Afghanistan, Europe, Abyssinia, eastwards to China.

Rosa macrophylla Lindl. Monog. Ros. 35, t. 6, 1820; Hk. f. in FBI. 2: 366, 1878.

An erect prickly shrub, 15-25 m high, with smooth green branches. Prickles more or less straight, often 0. Leaves paripinnate; leaflets 7-11, gradually smaller from the terminal downwards, elliptic, usually grey-pubescent beneath, finely serrate. Flowers bright-red or pink, solitary or in few-flowered corymbs. Fruit red, ovoid.

Commonly cultivated at Rajpur etc.

Fl. late March-May. *Fr.* July-Aug.

Distribution.—Temperate Himalaya from Murree to Sikkim. China.

Spiraea vacciniifolia D. Don, Prodr. 227, 1825; Hk. f in FBI. 2: 325, 1878; Collett, Fl. Sim. 159, 1902; S. K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6 (1): 40, 1971.

A shrub 5-120 cm high. Leaves variable, ovate or elliptic-lanceolate, 1.2-5 cm long, serrate, crenate or at times entire. Flowers white, 5-6 mm across, in dense-flowered terminal branching tomentose cymes. Calyx hairy outside, tube glabrous or more or less villous inside. Ripe carpels shining, glabrous or with a few long hairs, half sunk in the calyx-tube.

Along the slopes, Sahasradhara, S. K. Malhotra 31294.

Fl. & Fr. April-July.

Distribution.—Western Himalaya, 1800-2400 m.

This species is fairly common in Mussoorie, 1400-2100 m. Bhatta Fall, Barlowganj, Depot etc. Its occurrence in Sahasradhara at low elevations is extremely doubtful. Malhotra must

have collected it from the higher cliffs of Sahasradhara hill which do not fall within the limits of the flora. I have neither collected nor seen it in Sahasradhara proper.

SAXIFRAGACEÆ

Bergenia ciliata (Royle) Raizada in Ind. For. 85: 677, 1959. *Saxifraga ciliata* Royle, Ill. Bot. Himal. 226, t. 49, f. 2, 1835; Collett, Fl. Sim. 176, 1902; *Saxifraga ligulata* Wall. var. *ciliata* (Royle) C.B. Clarke in Hk. f. FBI. 2: 398, 1878. *Bergenia ligulata* (Wall.) Engl. var. *ciliata* (Royle) Engl. in Bot. Zeitg. 840, 1868, pro parte; S.K.; Malhotra in Maharashtra Vidnyan Mandir, Patrika 5 (1 & 2): 38, 1970.

A perennial herb with thick root-stock. Stems short, thick. Leaves suborbicular, 5-15 cm long at the time of flowering, enlarging in size in autumn, margin and both surfaces hirsute. Flowers pink or pink purple or fading to white, 1.5-2 cm across, in a spreading cymose panicle, terminating a flexible scape 10-25 cm long; styles long.

Sahasradhara, on moist rocky slopes, S.K. Malhotra 31219. Fl. & Fr. March-May.

Distribution:—N.W. Himalaya 1500-3000m, Nepal.

This species is gregarious on shady hill sides, 1500-2100 m in Mussoorie. Its occurrence in Sahasradhara proper at low elevations is extremely unlikely. I have never seen or collected it from Sahasradhara proper.

Deutzia staminea R. Br. in Wall. Pl. As. Rar. 2: 82, t. 191, 1830; C.B. Clarke in Hk. f. Fl. Br. Ind. 2: 407, 1878; Collett, Fl. Sim. 180, t. 52, 1902; Malhotra in Maharashtra Vidnyan Mandir, Patrika 6 (1): 40, 1971.

A shrub, 1-3 m high. Leaves opposite, lanceolate, ovate-lanceolate or ovate, 2-5.7 × 1-3.7 cm, serrate, acuminate, grey-tomentose beneath. Flowers white, 7.5-12 mm in diameter, in short trichotomous terminal panicles. Calyx-teeth triangular or linear-oblong, acute; capsules ovoid, 4 mm in diameter.

Along the slopes, Sahasradhara, S. K. Malhotra 31265.

Fl. March-Apr. Fr. May-July.

Distribution:— Western Himalaya, 1500-2700 m; China.

This species is common above 1500 m, usually in oak forests in Mussoorie, Barlowganj, Castle hill, Benog, Depot, etc. Its occurrence in Sahasradhara proper is very unlikely. I have never seen or collected it from here.

COMBRETACEÆ

Anogeissus coronata Stapf in Kew Bull. 1914: 133, 1914; *A. sericea* Brandis var. *nummularia* Brandis in Ind. Trees 315, 1906. *A. nummularia* King Mss. in Herb. Cal.; Raizada in Journ. Ind. Bot. Soc. 14(4): 132, 1935.

This species since it was described by Duthie on p. 340 of his Flora under *A. sericea* var. *nummularia* has proved to be a distinct species.

A moderate-sized tree. Leaves much smaller, shortly stalked, reniform, retuse or emarginate, mucronate, grey tomentose beneath, veins inconspicuous above, prominent beneath. Peduncles exceeding the leaves, often branched. Flower heads rather smaller.

Todgarh, Merwar, *A. E. Lowrie*; Merwara, *Duthie* 4663; Indore, *W. F. Biscoe*; Rampur division, Indore State, *A. B. Pande*.

Combretum ovalifolium Roxb. Fl. Ind. 2: 256, 1832; Clarke in Hk. f. FBI. 2: 458 1878; Raizada in Journ. Ind. Bot. Soc. 14 (4): 152, 1935.

A large sarmentose or climbing shrub with elliptic or ovate leaves 5-10 cm long, often nearly orbicular, pale and thin, rather variable in size. Flowers in paniced axillary spikes, occasionally forming a large terminal panicle. Flowers 4-merous. Fruit pale golden-yellow when ripe, 2-2.5 cm long and as broad as long, 4-seeded.

Deori Range, Saugor, *D. O. Witt*.

Fl Feb.-April. Fr. May.

Distribution.—Common throughout Deccan Peninsula and in Ceylon.

This extensive climber is very conspicuous because of its winged fruits. Leaves turn red before falling as in most *Combretaceae*.

LYTHRACEÆ

Rotala oculitiflora Koehne in Engl. Bot. Jahrb. 1: 152, 1880 & Pfeich. 17: 30 & 25 t. 2B, 1959; Gamble Fl. Madras 1:358, 1957 (Rep. ed.); Blatter & Hallb. in Journ. Bomb. Nat. His. Soc. 26: 705, 1918; Santapau Fl. Khandala 98. 1967; Panigrahi et al. in Bull. Bot. Surv. Ind. 11 (1 & 2): 104, 1969.

Erect or ascending or prostrate herb, growing in wet ground; at first green later turning brownish. Blatter & Hallberg loc. cit. remark about this plant: "This is a very distinct species and it is strange that it should have been overlooked

both by C.B. Clarke & T. Cooke." According to Santapau loc. cit. this species is "Common about Khandala near the station, the village tank and at the edge of ponds in St. Xavier's Villa. Flowers are not visible without dissection, as the supporting leaf covers them entirely.

Nishangarha, Bahraich dist. *Panigrahi* 6452, in alluvial mud.

Fl. & Fr. Sep.-Nov.

Distribution:—Madras Presidency, Bombay.

MYRTACEÆ

Callistemon citrinus (Curt.) Skeels (1913); Backer & Bakh. f. *Fl. Java* 3: 646, 1968. *Metrosideros citrinus* Curtis Bot. Mag. t. 260, 1794. *Callistemon citrinus* Stapf, in Bot. Mag. t. 9050, 1925. *Callistemon lanceolatus* (J.E. Smith) Sweet *Fl. Austr.* Sub. t. 29, 1827; DC. *Prodr.* 3: 223, 1928; Parker *For. Fl. Punjab* 245, 1918; Bailey, *Man. Cult. Plants*, 725, 1949, et *Stand. Cycloped. Hort.* 1: 630, 1950; Benthall *Trees Calc.* 249, 1946; Maheshwari *Fl. Delhi* 158, 1963; Backer & Bakh. f. *Fl. Java* 1: 347, 1963.

A small evergreen tree. Leaves alternate, linear-lanceolate, narrowed at both ends, 2.5-7.5 cm long and about 6 mm or more broad, sharply pointed, not rigid, gland dotted, mid vein and lateral nerves prominent. Flowers crimson, in terminal spikes which are not very dense, up to about 10 cm long, the branches soon growing through the spikes. Calyx-tube campanulate. Petals 5; stamens numerous, 2.5 cm long, bright red or crimson. Ovary 3-4 celled, ovules numerous. Fruit a woody cupshaped capsule, 0.4 cm long, ovoid, contracted at summit.

Commonly cultivated in gardens and parks.

Fl. March-April.

Distribution:—The 'Bottle Brush Tree' is indigenous to Queensland and New South Wales.

According to Backer & Bakh. f. (*Fl. Java* 3: 646, 1968, the oldest name for *Callistemon lanceolatus* Sweet is *C. citrinus* (Curt.) Skeels (1913); Stapf (1925). *C. lanceolatus* (J.E. Smith) Sweet is a younger synonym.

Callistemon viminalis Cheel in *Svensk. Vet-Akad. Handb. n. s.* 52 No. 10: 16, 1919; H.M. Hall in Bailey, *Stand. Cyclop. Hort.* 1: 630, 1950. *Metrosideros viminalis* Soland. ex Gaertn. *Fruct. J.* 171, t. 34, f. 1788.

A tall handsome graceful slender tree of pendulous habit; leaves linear-oblong. Flowers in dense cylindric spikes, the axis growing out as a leafy shoot; flowers very showy when in full bloom. Calyx- teeth 5; petals 5, deciduous. Stamens indefinite not united, slightly shorter than in *C. citrinus* and the rim of the fruit is thinner; ovary inferior.

This species is very close to *C. citrinus* (Curt.) Skeels = *C. lanceolatus* Sweet, but has a more pedulous (weeping habit) than *C. citrinus* Skeels.

Fl. March-May.

According to Bailey (loc. cit.) this species was formerly referred to *C. speciosus* DC. (Bot. Mag. t. 1761) of which this may be a form.

Distribution:—A native of Australia but now commonly cultivated.

The genus is distinguished from *Melaleuca* of which one species *M. leucadendron* (Linn.) Linn. is also occasionally cultivated as in Lahore, Delhi, Lucknow, Dehra Dun, etc.

Eucalyptus camaldulensis Dehnh. Cat. Pl. Hort. Camald. 20, 1832; Bailey. Man. Cult. Pl. 728, 1949; *E. rostrata* Schl. in Linnaea 20: 655, 1847.

A large tree, bark smooth, white or ashy. Leaves 10-15 cm long, more or less falcate. Flowers in axillary 3-12-flowered umbels; peduncle and pedicles rather slender. Operculum hemispheric, beaked, not exceeding the calyx-tube. Anthers opening by parallel slits. Fruits about 0.1 cm in diameter, on slender, conspicuous stalks, rim convex, valves prominently exerted.

Commonly cultivated in the plains.

Fl. May-June.

Distribution:—Indigenous to Australia.

Eucalyptus citriodora Hook. in Mitch. Journ. Trop. Austr. 235, 1848.

A tall tree with slender erect stem and smooth bark. Leaves 15-25 cm long, lanceolate, usually falcate, bright green, when crushed with an exquisite lemon scent. Flowers in usually 3-flowered umbels arranged in panicles on short leafless branches. Operculum hemispheric, abruptly shortly pointed. Stamens opening by slits. Fruits rather large, about 1.4 cm long, by 0.1 cm across, ovoid-urceolate, valves deeply enclosed.

Commonly cultivated in gardens in the plains.

Fl. Feb.-March.

Distribution.— Indigenous to Queensland.

Eucalyptus tereticornis Sm. in Bot. New Holl. 41, 1793 et in Trans. Linn. Soc. 3: 284, 1797. *E. umbellata* (Gaertn.) Domin. Bibl. Bot. Heft 89, V: 469 (1938)-non Dum.-Cours. Bot. Cult., ed. 2, 7: 279, 1814. *Leptospermum umbellatum* Gaertn. Fruct. 1: 174, t. 35, 1788.

A tall tree with a thick trunk. Bark smooth but blotched. Mature leaves alternate, $10-21 \times 1.2-2.5$ cm. Umbels axillary. 5-12-flowered. Buds horn-shaped to conical, 12-16 mm. Operculum conical, 2-3 times longer than the calyx-tube. Fruit hemispherical to turbinate, $6-9 \times 8-10$ mm, the calycine rim often sharp.

The large scale plantations of *Eucalyptus* raised recently by the various State Forest Departments in the name of "Mysore Gum" or "*Eucalyptus* 'hybrid' of Mysore Origin" contains a sizable proportion of this species. The so-called 'hybrid' (barring a very small percentage of true hybrids) is actually a mechanical mixture of seeds of a few *Eucalypts* and the progeny from this seed-source is mostly referable to *E. tereticornis*. Some of the places within the limits of this Flora where populations of this species are available are: Dehra Dun, (near Bibiwala), Lalkua near Haldwani, Bijnore, Kotdwar, Pilibhit, Lakhimpur Kheri in Uttar Pradesh; Hoshangabad in Madhya Pradesh and Ganganagar in Rajasthan. Of late, this species has become one of the commonest *Eucalyptus* of the area in question.

MELASTOMACEÆ

Osbeckia stellata Wall. ex D. Don, Prodr. Fl. Nepal 221, 1825; Clarke in? Hk. f. FBI. 2: 517, 1878; Collett, Fl. Sim. 191, f. 56, 1902.

An erect shrub, branches 4-sided, bristly. Leaves opposite, minutely bristly, shortly stalked, lanceolate, 7.5-15 cm, entire, tapering to a fine point; longitudinal nerves prominent; stipules 0. Flowers 2-sexual, regular, pink-purple, 5-6 cm across, in small, terminal clusters. Calyx clothed with soft matted, white, stellate, bristles. Petals 4 or 5, twisted in bud. Stamens 8 or 10, inserted with the petals on the mouth of calyx-tube; filaments yellow, curved; anthers 2-celled, longer than the filaments, strongly curved, yellow; ovary ovoid 4-or 5-celled, enclosed within and partially adnate to the calyx-tube. Capsule nearly free, oblong-ovate, about 2 cm long, opening at the tip by pores.

Shasradhara, along rocky slopes, S.K. Malhotra 29271. Fl. & Fr. Aug.-Nov.

Distribution:—From Simla to Bhutan upto 1800 m; China, Malaya.

ONAGRACEÆ

Epilobium hirsutum Linn. Sp. Pl. 347, 1753; DC. Prodr. 3: 42, 1828; Clarke in Hk. f. FBI. 2: 583, 1879; Murty & Singh in Sci. & Cult. 30 (3): 150, 1964.

A herb 5-12 cm high, occasionally much taller. Stem round, uniformly hairy with glandular pubescence and with scattered long white hairs numerous towards the end of branches. Middle cauline leaves opposite, often 7 cm, sessile, semi-amplexicaule, green and softly pubescent on both surface. Sepals green, oblong acute in expanded flower, in aestivation mucronate. Petals 4 cm, rose-purple. Ovary inferior, 4-celled. Stigmas 4, distinct, spreading. Capsule 5-9 cm, hairy, 4-angled, lower peduncles about 2.5 cm. Seeds ellipsoid or obovoid, 2.5 times as long as broad, little narrowed at the base, punctulate, not papillose, coma fulvous.

Dehra Dun *Raizada*; Bhola, (Meerut) on the banks of the Ganges Canal, Murty & Singh 1275, 1863.

Fl. & Fr. Sept.-Nov.

Distribution:—Temperate Western Himalaya from Kashmir to Kumaon, Europe, Africa, Asia.

Ludwigia hyssopifolia (G. Don) Exell, Garcia de Orta 5: 471, 1957; Janardhan & Prasad in Bull. Bot. Surv. Ind. 13 (1&2): 160, 1971. *Jussiaea hyssopifolia* G. Don, Gen. Syst. 2: 693, 1832. *J. fissendocarpa* Haines in Journ. As. Soc. Beng. n.s. 15: 313, 1920. et in Fl. Bihar & Orissa 2: 399, 1961 (Rep. ed.). *Fissendocarpa linifolia* (Vahl) Bennet in Journ. Bom. Nat. Hist. Soc. 67 (1): 126, 1970.

A very rough much-branched undershrub 54-72 cm high; stem-glabrous with raised decurrent lines from the leaf-bases or sub-alate. Leaves lanceolate or linear lanceolate, subsessile, acute; upper leaves about 2.5 cm not tapering to a slender base. Flowers sessile from all the upper axils. Sepals lanceolate, very small (about 3 mm). Petals shorter. Stamens with 4 smaller or absent. Hypanthium 4-ribbed. Capsule slender, minutely pubescent, 4 mm-6.5 mm long, terete, 4-celled. Seeds in upper part of capsule minute, ellipsoid, sub-compressed, pale brown, .07 mm with a prominent raphe (or white and half the size), several seriate, in the lower part of capsule 1-seriate, each enclosed in a 2-valved corky prismatic portion of the endocarp and larger.

Nandakini banks, Chitrakut, Banda dist. M.A. Rau 3833 & 3837

Distribution.—Bihar, Orissa, Uttar Pradesh, Rajasthan, Assam, West Bengal, Tamil Nadu, Maharashtra, Nagaland.

Haines (Bot. Bihar & Orissa 2: 399 rep. ed, 1961) treats this species under *Jussiaea* (Sect. *Fissendocarpa* Haines) under the name *J. fissendocarpa* Haines. Raven (Reinwardtia 6(4): 327-427, 1963) while revising the old World species of *Ludwigia*, also holds similar view that this species should constitute a monotypic section, but treats it under *Ludwigia* in his new section, *Fissendocarpa* (Haines) Raven, with the name *L. hyssopifolia* (G. Don) Exell. Recently Bennett (loc. cit.) has raised this section to generic level with the name, *Fissendocarpa* (Haines) Bennet, & treats the species as *Fissendocarpa linifolia* (Vahl) Bennet. I have, however, treated it under *Ludwigia hyssopifolia* G. Don.) Exell.

This species has often been confused in our herbaria with *L. perennis* Linn. (= *L. parviflora* Roxb.) or *L. prostrata* Roxb. both of which also occur in the Upper Gangetic Plain.

CUCURBITACEÆ

Bryopsis laciniosa* var. *walkeri Chakravarty (Rec. Bot. Surv. Ind. 17: 136, 1959) appears to me to be a variant of the type, as the characters—narrower segmented lamina, spinulose petiole and large flowers upon which this variety is based, are variable and often do occur in the typical variety. Its correct name, should be *Diplocyclos palmatus* (Linn.) Jeffery var. *walkeri* (Chakravarty) Bhandari et Singh in Bull. Bot. Surv. Ind. 6(2-4): 327, 1964.

Cyclanthera pedata Schrad. Linnaea 8: 23, 1823; Chakravarty in Rec. Bot. Surv. Ind. 17: 178, 1959.

An annual glabrous climber. Tendrils 2-3-fid. Leaves pedately 5-7-partite, 10-15 cm across, segments elliptic-oblongate-oblong, acute or acuminate, irregularly serrate, both male and female flowers occur in the same axils; male flowers in subumbellate panicles; pedicels 0.3-0.5 cm long; calyx 0.5 cm across, lobes triangular, acute, glandular pubescent; corolla divided to the base, lobes subulate, 0.1-0.12 cm long, pale yellow; anther-ring 0.12 cm across; female flowers solitary, subsessile. Fruit ellipsoid-oblong, attenuated at both ends, echinate, 5-8 cm long.

Rispana, Dehra Dun, C.R. Babu 35227. Rare, established in waste places and on hedges.

Fl. & Fr. April-June.

Distribution.—A native of S. America extending to Central America. Cultivated in N.W. & East Himalayas and also naturalized.

It is closely allied to *C. explodens* Naud, a central American species, which is often cultivated in the tropics, and is recognisable from this by 3-lobed leaves and shorter fruits.

The authority of *Citrullus* is Schrad. ex Eckl. & Zeyh. and the correct name of *C. vulgaris* is *C. lanatus* (Thunb.) Mansf. & Nakai. It is largely cultivated within the area for its fruit, 'Tarbusa'.

The correct name of *C. vulgaris* var. *fistulosus* which is also commonly cultivated within the area for its fruit 'Tinda', eaten as a vegetable, is *C. lanatus* var. *fistulosus* (Stocks) V.J. Nair in Bull. Bot. Surv. Ind. 10 Suppl. 2: 35, 1968-1969 (= *Praecitrullus fistulosus* (Stocks) Pang. in Kew Bull. 20: 420, 1966).

Dactyliandra welwitschii Hk. f. in Oliv. Fl. Trop. Afr. 2: 557, 1871; Meeuse in Bothalia 8: 10, 1962; Bhandari & Singh in Kew Bull. 19: 133-135, 1964; Maheshwari & Sharma in Bull. Bot. Surv. Ind. 11 (3 & 4): 455, 1969.

A scabrid, much branched, slender herb. Stem angled, grooved and scabrid trailing and climbing. Leaves 5-10 cm across, digitately 5-7-lobed with a stipuliform bract at the base of the petiole; lobes obovate serrate; or lanceolate, contracted at the base, irregularly sinuate-lobed, serrate; petiole 2.5-7.5 cm, rather stout. Stipular bract orbicular-reniform or dimidiate, strongly ciliate-toothed. Flowers monoecious. Male: subumbellate; calyx-tube campanulate; lobes 5, subulate. Corolla shortly campanulate, 5-lobed. Stamens 5, filaments free. Rudiment of ovary a depressed gland. Female fls. 2-3 mm across, numerous, subumbellated on slender scabrid peduncles; pedicels unequal about 1.5 cm. Berry scarlet, about 1.5 cm across, smooth dull red when ripe. Seeds dark coloured, or light brown, 6 mm long, 3 mm broad at the middle.

On the way to Nand Pushkar, Ajmer dist. V.S. Sharma 1892; Sonha near Delhi Maheshwari 52926.

Distribution:—Rajasthan, Gujarat, South West Africa and Angola (Meeuse l.c.).

In the field this species is easily mistaken for *Ctenolepis cerassiformis* (Stocks) Hk. f. (Syn. *Blastania fimbriatipulata* Kotschy & Peyr.) as both are often found to grow together. However, they can be readily distinguished by the marked dissimilarity in the shape of their seeds, besides other external characters of comparative value (Bhandari & Singh, loc. cit.).

Gymnopetalum cochinchinense (Lour.) Kurz in Journ. As. Soc. Beng. 40: 57, 1871; Clarke in Hk. f. FBI. 2: 611, 1879; Raizada in Ind. For. Rec. (n.s.) Botany 4 (3): 66, 1950; Chakravarty in Rec. Bot. Surv. Ind. 17: 62, 1959; *Bryonia cochinchinensis* Lour. Fl. Cochinch. 595, 1790.

A twining herb, stem 5-angular. Leaves 5-angled or lobed about half-way down, 5-8 cm in diameter, scabrous on both surfaces; tendrils simple, rarely 2-fid. Male racemed, peduncle sometimes 15-20 cm usually shorter; bract 2 cm incise-serrate, lobes again incised. Calyx-tube villous. Rudiments of the ovary in the male flower 3. Petals 1.5 cm, white, ovate, entire or somewhat crenate. Fruit 5 cm, orange-red, ovoid-oblong, about 10 cm long, somewhat scabrous, with 10 longitudinal ribs; pulp greenish not succulent.

Nagwa, Gorakhpur dist., Harsukh 21417; Rispana, Dehra Dun C. R. Babu 34920; Kansrao, Dehra Dun dist. Raizada.

Fl. April-May.

Distribution:—Sikkim, Assam, Cachar and Bengal, Chota Nagpur, Tenneserim, Malaya, China.

This species is usually confused with *Trichosanthes* which it resembles in leaves, but the tendrils are simple in this species, while they are 2-5-fid in *Trichosanthes*. From species of *Cucumis* which have also simple tendrils it can at once be distinguished by the flowers which are white in this species while they are yellow in *Cucumis*.

Gymnostemma pentaphyllum (Thunb.) Mikano in Bot. Mag. Tokyo 16:179, 1901. *Vitis pentaphylla* Fl. Thunb. Jap. 105, 1784. *G. pedata* Bl. Bijl. 23, 1849; Clarke in Hk.f. FBI. 2 : 633, 1879; Raizada in Ind. For. Rec. (n.s.) Botany 4 (3) : 66, 1951; Chakravarty in Rec. Bot. Surv. Ind. 17 : 188, 1959.

A slender herbaceous climber with simple tendrils. Leaves long stalked, pedate, usually 5-7-foliolate; leaflets vine-like, ovate-lanceolate, usually oblique, crenate-serrate; petiole 2.5-4 cm, often pubescent with a line of crisped hairs. Panicles usually 7.5-15 cm, sometimes 34 cm by about 25 cm broad, leafless. Flowers minute; styles 3 and 2 on the same plant. Fruit a greenish globose berry, pea-like, glabrous or puberulous.

Dehra Dun, Sept. 1882, Duthie.

Fl. Rainy season.

Distribution :—Kumaon, Nepal, Sikkim, Assam, Khasi Hills, Ceylon, Malaya, Japan, China.

This species is commonly mistaken for *Gomphogyne cissiformis* Griff. but differs from it in having simple tendrils and globose, pea-like fruit, while the tendrils are bifid and the fruit obovoid trigonous in *Gomphogyne cissiformis* Griff.

Luffa graveolens Roxb. Fl. Ind. 3 : 718, 1832; Clarke in Hk.f. FBI. 2 : 614, 1879; Srivastava in Journ. Bom. Nat. Hist.

Soc. 53 : 152, 1955; Chakravarty in Rec. Bot. Surv. India 17: 74, 1959.

A climber, stems long; tendrils 3-5-fid. Leaves 7 cm across, reniform-orbicular, 5-angled, denticulate, punctate, scabrous above, pubescent on the nerves beneath; petiole 5-7 cm. Male pedicels few, much shorter than the petiole; petals 5, yellow, entire; stamens 5. Female peduncle short, sometimes divided, with 2-3 flowers, each pedicel carrying a small ovate, entire thick bract. Fruit grey, ovoid, about 5 cm long, 2.5 cm broad, covered with papillae, scarcely spinous, obscurely 10 striate, dehiscent horizontally near the top. Seeds many, packed in fibres, smooth, not margined.

Mirzapur, *Srivastava*.

Fl. & Fr. April-June.

Distribution :—Sikkim, Rajmahal Hills (Bihar), Plains of East Bengal, Peninsular India, Bangla Desh, North Australia, Polynesia.

Sechium edule (Jacq.) Swartz, Fl. Ind. Occ. 2: 1150, 1800; Chakravarty in Rec. Bot. Surv. Ind. 17(1) : 204, 1959. *Chayita edulis* Jacq Amer. ed. Pict. 2: 245, 1780. *Sechium americana* Poir. in Lam. Encycl. 7 : 50, 1783.

A perennial with a tuberous rootstock. Stems glabrous. Tendrils 3-5-fid. Leaves broadly ovate orbicular, cordate at base, acute, 3-5-angular or lobed, subentire or obtusely dentate, scabrid above, 10-25 cm across. Male flowers in corymbose racemes; peduncle upto 20 cm long; calyx 0.2 cm. long, glabrous, lobes lanceolate, subacute, 0.13-2 cm; corolla greenish-yellow, lobes ovate-lanceolate, obtuse, 0.5-0.7 long; staminal column 0.3 cm long. Female flowers solitary; pedicels 2-5 cm long. Fruit pendulous, deeply sulcate, deeply impressed at apex, densely echinate, thinly hairy, 10-15 cm long.

Robber's Cave, *C.R. Babu* 34915.

Fl. & Fr. Sept.-Dec.

Cultivated and established along ravines and streams but not yet naturalised; native of tropical America.

Incidentally 'the Bottle gourd', *Lagenaria vulgaris* Ser. of which the correct name is *L. siceraria* (Molena) Standly in Pub. Field Mus. Nat. Hist. Bot 3 : 435, 1930 (based on *Cucurbita siceraria* Molena, Sagg. Stor. Nat. Chil. 133 : 335, 1782) is commonly cultivated and is often met with as an escape within the area of this flora.

SOLENA LOUR. (1790)

Cogniaux (in DC. Monogr. Phan. 3 : 605, 1881 et in Pfreich. 66 : 104, 1906) reduced to a section of *Melothria* Linn. (1753; 1754), with *Zehneria* Endl. (1883) under its synonymy. This view has been followed by Pax (Pflanzenfam. 4.5 : 15, 1889), Chakravarty (Rec. Bot. Surv. Ind. 17 : 138, 1959), with the acceptance of Jeffrey's recent classification of the family (Kew Bull. 15 : 337, 1962), *Solena* Lour., *Zehneria* Endl., *Mukia* Arn. and *Melothria* Linn. (sensu stricto), are now generally considered as distinct genera.

Solena heterophylla Lour. Fl. Coch. 1 : 514, 1790. *Bryonia umbellata* Klein in Willd. Sp. Pl. 4 : 618, 1815. *Zehneria umbellata* Thw. Enum. 125, 1853; Hk.f. in FBI. 2 : 625, 1879 (proparte). *Melothria heterophylla* (Lour.) Cong. in DC. Monogr. Phan. 3 : 618, 1881 et in Pfreich. 66 : 121, 1916; Duthie FUGP 1 : 378, 1903; Chakravarty in Rec. Bot. Surv. Ind. 17 : 159, 1959.

A perennial. Stems sulcate, glabrous. Tendrils simple. Leaves ovate-triangular to sagittate or suborbicular, entire to 3-5-lobed-partite, denticulate, cordate sagittate at base, scabrid above, glabrous, smooth, gland truncate on the lower surface, 4-15 × 2-8 cm. Flowers in corymbs; pedicels 0.8-1.5 cm long; lobes subulate; corolla yellowish, segments triangular, glandular-pubescent, 0.13-0.15 (—3) cm long; disk orange yellow; female flowers : calyx 0.5 cm long, solitary; pedicels 0.7-0.8 cm long; ovary smooth, 3-gonous, ribbed, mucricate, densely pubescent. Fruit oblong ovoid, 3-6 cm long, angular or ribbed.

New Forest, Dehra Dun, Raizada 75936, 80946; Rispana Dehra Dun, C.R. Babu 35277.

Fl. & Fr. March-Nov.

Very variable in shape, size and degree of lobation of leaves and size and shape of fruits.

Babu's 35277 closely resembles *S. angulata* (Chakravarty) Raizada comb. nov. (= *Melothria angulata* Chakravarty in Journ. Bomb. Nat. Hist. Soc. 50 : 899, 1952 et in Rec. Bot. Surv. Ind. 17 : 165, 1959), which is only a form of *S. heterophylla*, since 9-angular fruits and strongly margined rugose seeds, upon which it is based, show gradations which connect it with *S. heterophylla*. Further, 9 angular fruits with rugose seeds do often occur in this species.

PASSIFLORACEÆ

Passiflora foetida Linn. Sp. Pl. 959, 1753; Bot. Mag. t. 2619, 1826; Mast. in Hk.f. FBI. 2 : 599, 1879; Raizada in Journ.

Ind. Bot. Soc. 14(4) : 152, 1935; Bor & Raizada in Beaut. Ind. Shrubs & Climbers 259, 1954.

A slender foetid-smelling twiner. Leaves 3.7-7.4 cm, palmately 3-lobed, denticulate ciliate with gland-tipped hairs on margins and beneath and with simple hairs above. Stipules lacinate. Flowers 2-3 cm across, white, solitary, axillary. Involucre of the flowers moss-like, pectinate. Fruit about 1 cm in diameter, orange in colour when ripe, containing numerous seeds.

Naturalized in Dehradun, Raizada; also in several other parts of the Upper Gangetic Plain. Mirzapur-Kutwa, Bhatt 17691.

Fl. & Fr. Rainy and cold season.

Distribution :—Native of tropical America, naturalized in many tropical countries like India.

The corona and the moss-like bracteoles are very characteristic.

Passiflora suberosa Linn. Sp. Pl. 958, 1753; Mast. in Hk. f. FBI. 2 : 599, 1879; Raizada in Journ. Ind. Bot. Soc. 14(4) : 153, 1935; Bor & Raizada in Beaut. Ind. Shrubs and Climbers 251, 1954; Chakravarty in Bull. Bot. Soc. Beng. 3 : 54, 1949.

An annual or perennial twiner, tendrils axillary, covered with short appressed, white hairs. Stipules lanceolate-acuminate, 3-lobed; lobes lanceolate-acute, ciliate on the margins; petiole about 2 cm long, velvety, with two shortly stalked round glands at the middle. Flowers small, about 1 cm across, axillary, solitary, pedicellate. Receptacle saucer-shaped; sepals 5, oblong-obtuse, greenish yellow; petals absent. Corona of several filamentous series, the outermost spreading and half as long as sepals, followed by shorter threads, the innermost hair-like, the median series plicate, fringed at the apex. Gynophore slender. Stamens 5, filaments filiform; ovary globose, ending in 3 slender styles. Fruit ovoid, or globose, blue or purple up to 3 cm long.

Naturalized in damp shady places in Dehra Dun, Raizada.

Fl. July-Sept. *Fr.* Cold season.

Distribution :—A native of tropical America.

Another species of 'Passion flower', *P. morifolia* Masters fairly recently introduced has begun to run wild in Dehra Dun and will soon become naturalized in the areas.

BEGONIACEÆ

Begonia picta Smith Exot. Bot. 2 : t. 101, 1805; Clarke in Hk. f. FBI. 2 : 638, 1879; Raizada in Journ. Ind. Bot. Soc. 14(4) : 153, 1935; *Begonia echinata* Royle III. 313, t. 80, 1836.

A small succulent herb with tuberous rootstock. Leaves mostly radical, long petiolate, ovate, cordate, irregularly sinuate and toothed, upper surface roughly hairy, green, blotched and variegated with pink, lower pubescent. Flowers pink, monoecious, 2.5-3.7 cm in diameter, in axillary peduncled cymes. Petals none. Male flowers: Sepals 4, the two outer larger; stamens numerous. Female flowers: 5, ovary inferior. Capsule pubescent, 3-sided, the angles produced on thin flat wings, one of the wing much longer than the other.

Bidholi, Dehradun, *Sohan Lal*, Dehra Dun Herb. No. 28186; Robber's Cave, *C.R. Babu* 33463.

Fl. Rainy season. *Fr.* Aug.-Sept.

Distribution :—Himalaya from Simla to Bhutan, Khasi mountains, Chota Nagpur.

This species superficially resembles *Begonia amoena* Wall. ex DC. (= *B. tenella* D. Don) and has been recorded from Dehra Dun (Duthie 2303, Aug. 1882) by Duthie in his Flora. This specimen, however, is *B. picta* Smith and was wrongly identified. In fact all specimens collected from Dehra Dun and identified as *B. amoena* Wall. ex DC. and examined by the author turned out to be *B. picta* Smith. Apparently only the latter species occurs in Dehra Dun and not *B. amoena*.

B. picta Sm. is very closely allied to *B. tenuifolia* Dryand (Trans. Linn. Soc. 1 : 162, 1791) and may possibly be conspecific with it, in which case the correct name of this plant will be *B. tenuifolia* Dryand.

CACTACEÆ

Opuntia dillenii (Ker-Gawl.) Haw. Suppl. Pl. Succ. 79, 1819; DC. Prodr. 3 : 472, 1828; Clarke in Hk.f. FBI. 2 : 657, 1879; Burkill in Rec. Bot. Surv. Ind. 4 : 314, 1911.

A low spreading bush about 15 dm high. Branches flat, jointed, the joints 30-40 cm long, 12-20 cm broad, more or less obovate undulate, dull bluish-green, bearing 4-6 prickles and tufts of numerous hairs. Flowers yellow, often bisexual, regular. Perianth rotate, lobes numerous, the outer ovate, acute or obtuse with membranous margins, the inner obovate, rounded, mucronate. Stamens numerous about half the length of perianth. Berry pear-shaped, depressed with spines bearing tubercles near the apex, deep purplish or dull carmine when ripe.

Naturalised in various parts and planted in hedges; common in Delhi on the Ridge, *Mukerjee*.

Fl. Hot season.

Distribution :—Native of South America (Mexico), and probably introduced into this country by the Portuguese. It spreads rapidly, especially on waste barren land.

Opuntia elatior Mill. Gard. Dict. (ed. 8) no. 4, 1768; Burkill in Rec. Bot. Surv. Ind. 4 : 313, 1911; Backer & Bakh. f. Fl. Java 1 : 317, 1963. *Opuntia dillenii* auct. Grah. Cat. Bom. Pl. 546, 1839; Clarke in Hk. f. FBI. 2 : 657, 1878, non Haw. 1819; Duthie Fl. UGP. 1 : 384, 1903. *O. nigricans* of Cooke Fl. Bomb. Pres. 1 : 552.

A large succulent spiny shrub, internodes-like structures ovate-oblong, faintly marked with lines joining the areoles. Areoles with 2-5 spines, tawny-brown or black, all straight; flowers yellow, soon turning rose-pink. Stamens purple. Petals shorter than the filaments. Fruit red when ripe marked with areoles, but bristles and spines deciduous.

Naturalized, commonly found growing about Delhi.

Fl. Hot season.

Distribution :—Native of tropical America, naturalized in India, like Delhi, Andhra Pradesh, (Waltair, Krishna, Guntur, Nallore etc.) and various parts of the world.

Opuntia vulgaris Mill. Gard. Dict. (ed. 8) no. 1, 1768; *Opuntia monacantha* Haw. Suppl. Pl. Succ. 81, 1819; Burkill in Rec. Bot. Surv. Ind. 4 : 313, 1911; Gamble, Fl. Madras Pres. 548, 1919; Haines Bot. Bih. & Orissa 402, 1922; Backer & Bakh. f. Fl. Java 1 : 316, 1963; Raizada & Saxena in Journ. Bom. Nat. Hist. Soc. 64(1) : 81, 1967.

An erect, widely branched, succulent bush. Joints (internode-like portions) much compressed, obovate to oblanceolate, bright green, 10-40 × 5-15 cm. Areoles bearing only 1-3 spines of which the persistent one is 2-5 cm long. Leaves linear, subulate, caducous or absent. Flowers solitary, 5-7 cm long, 7.5 cm across, yellow; corolla spreading, rotate. Stamens yellow, short. Pistil shorter than stamens. Fruit green or red, nearly smooth.

Occasional in dry waste lands at Rajpur, *Saxena* 1918. Robber's Cave, Dehra Dun, *C.R. Babu* 35234.

Fl. April-May. *Fr.* June-July.

Distribution :—Native of tropical America; naturalized in various parts of India.

AIZOACEÆ

Corbichonia decumbens (Forsk.) Exell in Journ. Bot. 73 : 80, 1953; Andrews, Fl. Pl. Ango-Egypt. Sudan 1 : 91, t. 59, 1950; Jeffrey in Fl. Trop. E. Africa (Aizoaceae) 9. f. 3, 1961; Jafri. Fl. Kar. 117, 1965; Y. Nasir, Fl. W. Pakistan 41 : 7, 1973. *Orygia decumbens* Forsk. Fl. Aegypt-Arab. 103, 1775; DC. Prodr. 3 : 400, 1828; Clarke in Hk.f. FBI. 2 : 661, 1879; Raizada & Sharma in Ind. For. 88(5) : 361, 1962. *Glinus trianthemoides* Heyne in Roth, Nov. Sp. 231, 1821. *Portulaca decumbens* (Forsk.) Vahl, Symb. 833, 1794.

A rigid branched glabrous herb; stem 15-27 cm, somewhat angular or trigonous. Leaves opposite and alternate, fleshy, entire, obovate, cuspidate upto 2.5 cm. Cymes terminal and leaf opposed, lax, few-flowered with small lanceolate bracts at their division. Flowers small, pedicelled; sepals purplish-green with scarious edges, acute. Petals 0; staminodes many, small, subhypogynous. Stamens 12 or more; ovary free, globose 5-ribbed, 5-celled; styles 5, filiform. Ovules many, axile; capsule globose, papery, wrapped in the persistent sepals; seeds black, not shining, with numerous concentric lines.

Beawar, Ajmer district, V.S. Sharma 1076.

Fl. & Fr. Aug.-Sept.

Distribution:—Dry and hot parts of India from the Punjab and Sindh to Mysore and Coimbatore; naturalized in Bengal, Western Asia, Africa, Arabia.

Some authors including Hutchinson, have split this family into two separate families, *Molluginaceae* — with free perianth—and *Ficoidae* — with a gamopetalous perianth. According to Backer in Fl. Males. (Ser. 1) 4(3) : 267, 1951, this seems unnecessary. I follow Backer.

Limeum indicum Stocks ex T. Anderss. in Journ. Linn. Soc. 5. Suppl. 1 : 30, 1860; Clarke in Hk.f. FBI. 2 : 664, 1879; Raizada and Sharma in Ind. For. 88(5) : 361, 1962; Y. Nasir in Fl. West Pakistan 41 : 11, 1973.

A prostrate, glandular-puberulous herb. Leaves spatulate round, opposite or nearly so. Cymes sessile at the nodes. Sepals roundish. Petals 3-5, much shorter than sepals, obovate, clawed. Stamens 6-7; ovary globose, 2-celled with 1 ovule in each cell. Carpels in fruit as long as the sepals, hemispheric, dehiscing ventrally. Seeds reniform, longer than broad, compressed, smooth, whitish.

Beawar, Ajmer district, V.S. Sharma 1619.

Fl. & Fr. Aug.-Sept.

Distribution :—Punjab and Sindh; Aden, Nubia.

Sesuvium sesuvioides (Fenzl.) Verdcourt in Kew Bull. 1957 : 349, 1957; Raizada & Sharma in Ind. For. 88(5) : 360, 1962; Y. Nasir in Fl. West Pakistan 41 : 4, 1973. *Diplochonium sesuvioides* Fenzl., in Monogr. Mollug. 1 (Extra) 292 (ad note) and Nov. Stirp. Dec. 7, 58, 1839. *Trianthema hydaspica* Edgew. in Journ. Linn. Soc. Bot. 6 : 203, 1862; Clarke in Hk.f. FBI. 24: 661, 1879; Jafri Fl. Kar. 117, 1965; *T. polysperma* Hochst. ex Oliv. Fl. Trop. Afr. 2 : 588, 1871.

A small prostrate succulent herb. Branches upto 30 cm long, glabrous, sinuately papillose. Leaves small, 0.8-2 × 0.4-1 cm, fleshy, ovate or elliptic-oblong, obtuse; petiole dilated at base and membranous at margins. Flowers usually solitary axillary with the obconic perianth-tube, free segments 5, about as long as tube, triangular, acuminate, coloured purple-red or pink, deflexed in fruit. Stamens 5-7. Ovary with 2 long white styles; capsule dehiscing by conical cap. Seeds black.

Govindgarh, Ajmer district, V.S. Sharma 1945.

Fl. & Fr. Cold season.

Distribution :—India (Rajasthan, Bombay)—East Tropical Africa, W. Pakistan (Sindh, Punjab, Karachi).

The genus *Sesuvium* Linn. chiefly differs from *Trianthema* Linn. in that in the former the ovary and capsule are 3-5-celled while in *Trianthema* ovary and capsule are 1-2-celled.

UMBELLIFERÆ (Apiaceae)

Anthriscus scandicina (Weber) Mansf. in Fedde, Repert. 46 : 309, 1939; Constance in N. Amer. Fl. 28 B : 115, 1944. *Caucalis scandicina* Weber in Wiggers Prim. Fl. Hotsat. 23, 1780. *Scandix anthriscus* Linn. Sp. Pl. 368, 1753. *Anthriscus vulgaris* Pers. Syn. Pl. 1 : 320, 1805 (non *A. vulgaris* Bernh. 1800).

An erect much branched, foetid, annual herb. Stems terete, glabrous. Leaves 3-pinnate, hispidly hairy; ultimate segments ovate-lanceolate, pinnatifid-partite; sheaths white-margined ciliate. Umbels terminal or leaf-opposed; peduncles glabrous, 0.0-6 cm long; involucre 1, linear subulate, 0.3-0.4 cm long; involuclcs 4-5, lanceolate, ciliate, 0.18-0.2 cm long; umbellules 3-5-flowered, pedicels 0.1-0.3 cm; calyx-teeth none; petals incurved, apiculate, 0.5 cm long; filaments .03-.04 cm long; fruit oblong-ovoid, clothed with uncinatc bristles, 0.3 × 0.2 cm.

Rispana, Dehra Dun C.R. Babu 35225.

Fl. & Fr. March-May.

Native of Europe, now naturalized in road-sides and waste places. It is being reported from India for the first time.

Apium leptophyllum (Pers.) F.V.M. ex Benth. Fl. Austr. 3 : 372, 1866; Constance in N. Amer. Fl. 28 B : 129, 1944; Raizada in Journ. Ind. Bot. Soc 14(4) : 153, 1935; Backer & Bakh. f., Fl. Java 2 : 175, 1965; Hiroe, Umbel. Asia 54, 1958. *Pimpinella leptophylla* Pers. Syn. Pl. 1 : 324, 1805. *Cnidium tenuifolium* Moench. Meth. 98, 1794, nom. illeg. *Apium tenuifolium* Thell. in Hegi. Ill. Fl. Mitteleur 5 : 1140, 1926 nom. illeg.; Buw in Blumea 2 : 181, 1936 et Fl. Males. (Ser. 1) 4 : 131, 1941.

An erect or diffuse, glabrous annual herb about 40 cm high. Leaves ternately divided into numerous filiform segments, the lower ones petiolate, the upper sessile, with fewer segments. Umbels at the nodes pedunculate, rarely sessile of 2-3 slender rays, each with a partial umbel of many flowers on slender pedicels, without involucre bracts; calyx-teeth inconspicuous. Petals ovate or broad with a short inflexed tip, the margins not recurved, scarcely imbricate; disk rather broad, convex, scarcely distinct from the very short style. Carpels ovoid, 8-ribbed. Ribs of the carpel very prominent and thick, almost corky, separated by narrow furrows, with one vitta under each furrow.

A very common weed in damp places in Dehra Dun, Raizada, Parker. It is of fairly recent introduction.

Fl. & Fr. Greater part of the year.

Distribution :—Throughout the greater part of India (introduced). Native of C. & S. America, Australia and New Zealand.

Contrary to Buw's views, I have followed Backer and Bakh.f. (loc. cit.) and Constance (loc. cit.) in adopting *A. leptophyllum* (Pers.) F.V.M. ex Benth. as the correct and legitimate name for this species.

Oenanthe benghalensis (Roxb.) Kurz in Journ. As. Soc. Beng. 2 : 115, 1877; Clarke in Hk.f. FBI. 2 : 696, 1879. *Sesseli benghalensis* Roxb. (Hort. Beng. 22, 1814 nom. nud.) and Fl. Ind. 2 : 94, 1832; Husain in Ind. For. 93 (8) : 582, 1967.

A erect, glabrous herb upto 24 cm or so high with fibrous roots. Leaves 2-pinnate, secondary pinnae lanceolate or ovate often deeply pinnatifid, ultimate segments never linear; peduncles usually short, often 0. Bracts 0; rays 4-6. Calyx-teeth small; petals white, emarginate, reflexed. Stamens 5; carpels subquadrate ellipsoid; dorsal and intermediate ridges usually distinct, scarcely prominent. Seeds nearly terete, inner face plane.

Kalinadi, Aligarh distr. Husain 572; Basantwala, Dehra Dun, Raizada; Nalapani, Dehra Dun J.S. Gamble 24563.

Fl. Jan.-Feb. and Fr. April.

Distribution :—Bengal plains and Assam — Formosa.

Pimpinella diversifolia DC. Prodr. 4 : 122, 1830; C.B.

Clarke in Hk.f. FBI. 2 : 688, 1879; Collet. Fl. Sim. 210, t. 64, 1902; Wolff in Pfreich. 90 : 269, 1927; S.K. Malhotra in Maharashtra Vindhyan Mandir, Patrika 6(1) : 41, 1971.

An erect, hairy or pubescent herb 25-90 cm high. Leaves pinnate or bipinnatifid; leaflets 3 or 5, variable in shape, ovate-lanceolate or lanceolate, irregularly incise-serrate or toothed, often long-pointed. Bracts 0 or 1-2. Flowers white in compound umbels. Involucre 0 or 1-2. Involucel 0. Fruit ovoid, papillose-hairy.

Along moist rocks, Sahasradhara, S.K. Malhotra 33990.

Fl. & Fr. July-Oct.

Distribution :—Temperate Himalaya, 1,900-3,000 m; China.

This species is common in shady places in Mussoorie : Municipal Garden Road, Kempti Road, Cloud End etc. and I have great doubts if it occurs and descends as low as at the foot of Sahasradhara which is in the limits of the region of this flora.

Psammogeton canescens (DC.) Vatke in App. ad. Ind. Sem. Hort. Berol. 3, 1876; Hiroe Umbel. Asia 1 : 37, 1957; Kitamura Fl. Afgh. 296, 1960. *Athamantha canescens* DC. Prodr. 4 : 155, 1830. *Psammogeton biternatum* Edgew. in Trans. Linn. Soc. 20 : 57, 1846; Clarke in Hk.f. FBI. 2 : 719, 1879; Raizada in Journ. Ind. Bot. Soc. 14(4) : 152, 1935.

A small annual pubescent herb. Leaves 1-2-pinnate; pinnae lacinate; segments of the lower leaves ovate pinnatifid into narrow lobes, of the upper narrowly cuneate lacinate; umbels compound, bracts 3-8, narrowly lanceolate or linear. Calyx-teeth obsolete. Petals obovate, apex narrowed, inflexed, whitish; fruit 2 mm, ovate oblong or lanceolate, thinly hairy, styles very long.

Dayalbagh, Agra, Raizada Dehra Dun Herb. No. 6214; Biharigarh, Saharanpur dist., Raizada 5017; Rispana, Dehra Dun C.R. Babu 35209; Alwar, L.N. Vyas 716; in the vicinity of Suraj Kund, Delhi, Dakshini.

Fl. March.

Distribution :—Punjab Plain, ascending the Himalaya to 900 m, Sindh, Baluchistan, Kabul, Afghanistan, Persia, USSR.

Nasir (Biologia 3 : 70, 1957) treated *P. canescens* (DC.) Vatke as distinct from *P. biternatum* Edgew. which was reduced to a synonym of the former by Hiroe (loc. cit.), whose views have been adopted by Kitamura (l.c.). He distinguished the former by densely pubescent leaves in contrast to glabrous or sparsely pubescent leaves of the latter. In my opinion Hiroe is

correct in treating both as one taxon, since the pubescence of leaves is very variable in this species.

Psammogeton canescens (DC.) Vatke var. *villosum* (Cl.) Raizada *com. nov.* (*Psammogeton biternatum* var. *villosa* Cl. in Hk.f. FBI. 2 : 719, 1879) differs from the typical variety by taller and soft-patent hairy stems and densely-brown-hairy fruits. It is found in Sindh, Baluchistan and Kabul.

Peucedanum nepalense P.K. Mukherjee in Ind. For. 95 : 567, 1979. *P. glaucum* DC. Prodr. 4 : 179, 1830 non Link 1821; Clarke in Hk.f. FBI. 2 : 710, 1879; *P. dehradunensis* Babu in Ind. For. 96 : 535, 1970 excl. *P. thasense* Cl. Ms. et para typii loco tibehiana.

An erect, glabrous perennial herb. Stem from fusiform taproots; fistular, striate, 50-120 cm tall. Lower cauline leaves biternatisect, long petiolate, 30-45 cm long including the petiole; leaflets lanceolate oblong, acuminate or mucronate, entire or remotely serrate, glabrous, 3-5 cm long, 5-7 cm broad; petiole 5-15 cm long, basally inflated, sheathing. Upper leaves pinnately trifoliate or reduced only to inflated sheaths with apical linear segments. Umbels terminal or axillary; peduncle 10-40 cm long. Involucre absent or of 1-2 linear bracts, about 4 mm. Rays 6-16, unequal, 2-5 cm. long. Involucels absent or of 1-5 linear, deciduous, 1.5-3.5 mm long bracteoles. Pedicels 15-40, unequal, 5 mm-1.2 cm; calyx teeth obsolete. Petals ovate oblong to obovate, inflexed, often slightly unequal. Fruit sub-quadrate or elliptic-oblong, emarginate at both ends, .9-1.1 cm x .4- cm. glabrous; mericarps dorsally flattened; dorsal ribs slender, lateral winged, wing equal to the body, vittæ solitary (2 ?) at intervals, 2-(4-6) at the commissure; commissure face plane, carpophore bipartite; stylopodium conic.

Deyradhoon, *Wallich* 580 (Calc.); Bindal ravines, Dehra Dun, *C.R. Babu* 35058.

Babu while describing his *P. dehradunensis* mentioned *P. thasense* Clarke Ms. in synonymy and the sheets he mentioned from Tibet are found to be the same as *Ligusticum waltonii* Wolff (*Seseli waltonii* Clarke) and these are altogether different from Babu's own plant (Babu 35058). I could not see any fruit in Babu's specimens and the leaflets are entire there, I strongly suspect them to be the same as *P. nepalense* P.K. Mukherjee in Ind. For. 95 : 567, 1969.

According to Babu (loc. cit) his species *P. dehradunensis* is superficially allied to *P. dhana* Buch.-Ham. ex Cl., but can be easily distinguished by its robust habit, large 3-pinnate leaves which are mostly in a basal rosette, large compound umbel, white flowers, bigger fruits and mericarps with prominent dorsal ribs and winged marginal ribs.

It is often erroneously identified in the herbarium as *P. glaucum* DC. from which it is easily recognisable by leaves being in rosettes, entire ultimate leaf-segments, presence of involucre and involucels, 4-5-rayed umbels, 20-40-flowered umbellules and mericarps with prominent winged marginal ribs and dorsal ribs, 4-6-vittate ridges and 4-6 vittate commissure.

CORNACEÆ

Cornus oblonga Wall. in Roxb. Fl. Ind. (ed. 1) 1 : 433, 1820; Hemsl. in Kew Bull. 1909: 334, 1909; C.B. Clarke in Hk. f. FBI. 2 : 744, 1879; Wang in Pfreich. 41 : 64, 1910; Collett, Fl. Sim. 220, 1902; S. K. Malhotra in Maharastra Vidnyan Mandir, Patrika 6(1) : 41, 1971.

A small tree or a large shrub. Leaves oblong, lamina 10-17 × 2-4.5 cm, entire. Flowers creamy-white, 8 mm across, in branched terminal cymes. Petals oblong, glabrous. Stamens pink. Fruits ovoid, 6-9 mm long, 3-chambered.

Sahasradhara, S.K. Malhotra 30792, growing along the slopes.

Fl. Aug.-Oct. Fr. Sept.-Jan.

Distribution:—Temperate Himalaya, 1200-2100 m; Burma, Yunnan.

This species is common in Mussoorie, between 1200-2100 m usually in oak forests: Katta Pathar, Barlowganj, Jabarkhet, Depot etc. Its occurrence at the foot of Sahasradhara is very doubtful and I suspect the specimen quoted above was collected from a much higher altitude.

RUBIACEÆ

Anthocephalus chinensis (Lamk.) A. Rich. ex Walp. Rep. 2 : 461, 1843; Backer & Bakh. f. Fl. Java 2 : 303, 1965; Bakh. f. in Taxon 19 : 469, 1970. *Cephalanthus chinensis* Lamk. Encycl. Meth. Bot. 1 : 678, 1785. *Anthocephalus indicus* A. Rich. in Mem. Soc. Hist. Nat. Paris 5 : 238, 1834; Duthie Fl. Upper Gang. Plain 1 : 432, 1903. *A. cadamba* (Roxb.) Miq. Fl. Ind. Bat. 2 : 135, 1856; Hk. f. in FBI. 3 : 233, 1880; Raizada in Journ. Ind. Bot. Soc. 14(4) : 154, 1935; Osmaston For. Fl. Kumaon 286, 1927; *Nauclea cadamba* Roxb. Fl. Ind. 1 : 512, 1832.

A medium-sized tree. Leaves coriaceous, shining and glabrous above, pubescent beneath, 15-30 cm long, 10-18 cm broad, elliptic-oblong or ovate; stipules lanceolate, cauducuous; petiole 2.5-5 cm long, terete. Flowers in terminal globose.

peduncled solitary heads, fragrant at night; calyx-limb tubular, 5-lobed, persistent or deciduous. Corolla-tube long, funnel-shaped. Stigma white, much exserted. Fruit a globose pseudocarp about 4-5 cm across, yellow when ripe.

Golapani, Haldwani division, *Osmaston* 1332.

Fl. Hot and Rainy season. *Fr.* Oct.-Nov.

Distribution:—From Himalaya to Ceylon and Malaya, wild or cultivated. Burma, Sumatra, Borneo.

This handsome tree with drooping branches and fragrant flowers which are in globular heads, the size of a small orange is commonly cultivated, particularly in Dehra Dun either singly, or as an avenue tree, of which there is a magnificent avenue in the Forest Research Institute, New Forest, Dehra Dun. During the hot and rainy season when the tree is in bloom, the odour can be detected from a fairly long distance.

Argostemma verticillatum Wall. in Roxb. *Fl. Ind.* ed. Carey & Wall. 2 : 325, 1824; Som Deva in Bull. Bot. Surv. Ind. 10(2) : 180, 1968.

A delicate, nearly glabrous herb. Stems slender, erect 5-15 cm. Leaves 4, sessile in a terminal whorl, unequal, lanceolate, 2.5-10 cm, lower surface pale; stipules minute. Flowers white, in terminal umbels about .8 cm across. Calyx 5-toothed, teeth acute. Corolla rotate, 5-partite; segments acute, spreading. Stamens 5; anthers oblong, erect, dehiscing by terminal pores. Ovary 2-celled, opening irregularly at top; seeds numerous, minute.

Rajpur, Raizada, in Sal forest; Sahasradhara, *Som Deva* 2608.

Fl. July-Aug.

Distribution:—Temperate Himalaya, from Kumaon to Sikkim, Khasia Mts., Canara, Burma, Malaya.

Dentella serphyllifolia Wall. ex Airy-Shaw in Kew Bull. 1932 : 298, 1932; Merrill in Journ. Arnold Arb. 35:155, 1954; Subramanyam & Sharma in Bull. Bot. Surv. Ind. 10 : 389, 1968; *D. repens* sensu Hk. f. in FBI, 3: 42, 1880 pro parte.

A small dichotomous herb; branches slender, prostrate rarely ascending, rooting at nodes; stems sharply 4-gonous, furrowed, green, glabrous. Leaves opposite, sessile or subsessile. 4.9 × 1.5-3 mm, obovate-oblanceolate, oblanceolate, subspathulate, oblong-elliptic, entire, glabrous, acute or obtuse at apex, narrowed at base, 1-nerved; stipules small, scarious, connate. Flowers small, solitary, axillary and in forks of branches,

subsessile or very shortly pedicelled. Calyx about 3 mm long, membranous, persistent; limb tubular, glabrous, 5-nerved, 5-toothed; teeth subulate, acute. Corolla 7.5-8 mm long, infunduliform, white, at times with 5 pale blackish-purple spots on throat, hairy within, fugacious; lobes 5, ovate, subdentate and acute at apex. Stamens 5, inserted on corolla-tube in lower half; filaments short; anthers linear, dorsifixed, introrse, dehiscing longitudinally. Ovary 2-celled, oblong-ovoid, glabrous; ovules many on axile placentae; style simple, short; stigmas 2, filiform. Fruit 2.3×2.5 mm, obliquely ellipsoid, plano-spheric or oblong-ovoid, slightly dorsiventrally compressed, faintly 5-ribbed, dry, indehiscent, shortly stalked, glabrous, crowned by persistent calyx. Seeds numerous, minute, spherico-tetrahedral or variously polygonal, dark brown, reticulate, finely echinulate along angles.

Ramgarhtal, Gorakhpur, *M.A. Rau* 12193; Gorakhpur, *Dixit & Siddiqui*.

Fl. April-May.

Distribution:—Andhra Pradesh, Assam, Bihar, Orissa, West Bengal & Uttar Pradesh, Burma, Bengla Desh, Malaya Archipelago and Philippines.

Galium aparine Linn. *Sp. Pl.* 108, 1753; *Hk. f. in FBI.* 3: 205, 1880; *Saxena in Ind. For.* 93 (5): 329, 1967; *Som Deva in Bull. Bot. Surv. India* 10 (2): 180, 1968.

A rambling or climbing herb. Stem-angles beset with minute recurved prickles. Leaves in whorls of 6-8, linear or narrowly ovate-oblong, 1.2-3.7 cm long. Flowers white, very small, in terminal and axillary cymes. Fruit didymous, covered with hooked bristles, 0.4 cm across.

Rajpur (900 m) along way sides or streams in moist dry places, *Raizada*, Ajabpur, near Dehra Dun *Balapure* s.n.; *Robber's Cave*, Dehra Dun *C.R. Babu* 35057; *Som Deva* 391, 1345.

Fl. & Fr. Feb.-May.

Distribution:—Himalaya, West Asia, North Africa, Europe.

Galium elegans Wall. in *Roxb. Fl. Ind.* 1: 382, 1820; *Cufodontis in Oester. Bot. Zeits.* 89: 228, 1940; *Kitamura in Acta Phytotax. Goebot.* 16: 195, 1956. *Galium rotundifolium* auct. non Linn. 1753; *Hk. f. in FBI.* 3: 204, 1880; *Som Deva in Bull. Bot. Surv. India* 10 (2): 180, 1968.

Prostrate or scrambling, slender, often muchbranched, perennial herb. Stem 4-angled, flaccid, shortly scabridly hairy on angles. Leaves ovate-lanceolate to elliptic-oblong, acute or

subobtusate at apex, glabrous often scabrid hairy on margins, 1.5-2 × 0.6-1 cm. Flowers in many-flowered leafy cymose panicles; pedicels 0.2-0.3 cm; calyx-teeth none; corolla greenish-yellow, lobes ovate, acute, glabrous. Fruit didymous, densely clothed with hooked hairs.

Bindal, Dehra Dun C.R. Babu 32269, rare in marshy shady localities, river-banks and rocky walls. Sahasradhara Raizada s.n., Som Deva 2674; Robber's Cave, Som Deva 2136; near Rajpur, Som Deva 2965.

Fl. & Fr. Aug.-Nov.

Distribution:—N.W. Himalaya 1320-3300 m.

Hooker f. (loc. cit.) lumped this under *G. rotundifolium* Linn., an European species which is quite different, and may not occur in India and other Asiatic countries. However, Backer & Bakh. f. (Fl. Java 2: 355, 1965) treated the Javanese plant as *G. rotundifolium* L.

Galium vestitum D. Don, Prodr. 133, 1825; Hk. f. in FBI. 3: 206, 1881; Som Deva in Bull. Bot. Surv. India 10 (2): 180, 1968.

A perennial herb, scaberulously pubescent all over. Stems stout, ascending. Leaves sessile 4-5 in a whorl up to 2 cm, oblong, rigid, pubescent on both surfaces, margins recurved, nerves, obsolete; cymes short, but longer than leaves, terminal, axillary few-flowered. Flowers minute. Fruit very small, clothed with hooked hairs.

Sahasradhara, on rocky slopes of limestone hills, Raizada; S.K. Malhotra 28174. Near Rajpur Som Deva 1115, 2814, Sahasradhara Som Deva 1331, 2688.

Distribution:—Western and Central Himalaya up to 3000 m, Garhwal, Nepal.

Hedyotis umbellata (Linn.) Lamk. Encycl. Meth. Bot. 1: 272, 1783; Back. & Bakh. f. Fl. Java 2: 286, 1965. *Oldenlandia umbellata* Linn. Sp. Pl. 119, 1753; Hk. f. FBI. 3: 66, 1880; Gamble, Fl. Madras 2: 424, 1918; Cooke, Fl. Bombay 2: 17 Rep. 1957; Haines, Bot. Bih. & Or. 447, 1924.

A diffuse, somewhat erect herb, branching from the base, with a very long yellow-red taproot. Stems angular, rather densely pubescent. Leaves 1-2.6 × 0.2-0.5 cm, linear, or linear-lanceolate, or almost acicular, acute at apex, entire. Stipules membranous, petiole very short. Flowers white, with pink margins, 2-10, in axillary, extra-axillary, sometimes terminal, peduncled umbels. Calyx-teeth linear-lanceolate. Fruit a

transversely dehiscent bilobed capsule. Crown flat, not protruding beyond the calyx-teeth. Seeds many, brown, ellipsoid.

Mala, Pilibhit, 13-10-1970, C.L. Malhotra 42761; Bisalpur, Pilibhit, 21-10-70, C.L. Malhotra 42900, common among grasses in moist shady spots in Sal forests.

Fl. & Fr. July-Dec.

Distribution:—Westren Peninsula, from Orissa southwards, Burma, Malesia, Ceylon.

Kohautia nagporensis (Brace ex Haines) Sant. et Merch. in Bull. Bot. Surv. India 3: 108, 1961; V.S. Sharma in Ind. For. 99 (3): 159-162, 1973. *Oldenlandia nagporensis* Brace ex Haines, Bot. Bih. & Or. 448, 1922; *O. senegalensis* sensu Hook. f. in FBI. 3: 68, 1880; Narine, Fl. Pl. West. India: 143, 1894; Woodrow in Journ. Bomb. Nat. Hist. Soc. 11: 644, 1898; Cooke, Fl. Pres. Bomb. 1: 592, 1903; Blatter in Journ. Bomb. Nat. Hist. Soc. 34: 785, 1933, non Hiern, 1877? *Hedyotis senegalensis* sensu Dalz. et Gibs. Bomb. Fl. 117, 1861, non Steud. 1841.

An annual strict herb (10-) 15-30 (-40) cm tall, haplocaulous, rarely forked from below. Stems much slender, up to about 1.5 mm thick towards the base, terete or obscurely quadrate (sometimes apparently trigonous) with rounded angles, scabridulous with minute papillae, branching dichotomously from above the basal few nodes or more commonly from above the middle or much above; branches stiff and erect, forming a pyramidal loose paniculate cyme, usually one of the two opposite branch either suppressed or feebly developed; internodes 2-6 cm long; leaves opposite, and often in axillary fascicles on very abbreviated shoots in the axils, linear-lanceolate, (1.5-) 2-4 (-5) cm long, 0.8-2 mm wide, tapering at both ends, apex acute or acuminate, entire or distinctively revolute, inconspicuously scabridulous with minute papillae on both surfaces, often glabrescent, mid-vein somewhat prominent beneath; stipular-sheath truncate, at older nodes sometimes as long as about 2 mm, much shortened or hardly produced at upper nodes; sheath-appendages two on either side, interpetiolar at first (at least those towards the base), soon displaced laterally and projecting on either side of the leaf base, 0.5-1.5 (-2) mm long, setaceous, simple or dissected, in older sheaths, often one or more extra minute teeth seen inbetween the two appendages of each stipule. Inflorescence dichasial at base, with monochasial branches above. Flowers lax, always solitary at each node. Lower most bracts foliaceous, much shorter than the leaves, ascendingly smaller; uppermost bracts minute, lanceolate, or subulate, usually dissected into marginal filiform processes. Pedicels (0.8-) 1-1.5 (-2.2) cm long, exceedingly slender, stiff and erecto-patent, scabridu-

lous as the branches. Calyx-segements subulate, acute or acuminate about 0.5-0.6 mm long, distant in fruit. Corolla dirty-green, about 4-5.2 mm long, minutely papillose in the upper half; corolla-tube about 3.4 mm long, glabrous inside, the narrowed cylindric part about 2-3 mm long, and about 0.3 mm in diam; corolla segments about 1-1.5 mm long and about 0.3-0.4 mm broad at base, subulate, acute or acuminate. Anthers about 0.8 mm long, mucronulate, notched at base. Pollen-grains 4-colporate, 15-17 μ long, 12-13 μ in diam. Ovary minutely paillose, verrucose; style about 2.5-3.5 mm long; stylar-arms 1-1.5 mm long. Capsules sub-globose, hardly projecting above the calyx-segments. Seeds very minute, glutinous when moistened.

Nagar Pahar Mt., Ajmer, V. S. Sharma 1132; Saharanpur Siwaliks, 610 m, Gamble 23984 under "*Oldenlandia bracteata*" (DD).

Fl. & Fr. Aug.-Oct.

Distribution:—Bihar, Uttar Pradesh, Rajasthan, Madhya Pradesh, and Maharashtra.

Among the species mentioned by Hooker (loc. cit.) under *Oldenlandia* subgen. *Kohautia*, *O. gracilis* (-*Kohautia gracilis* (Wall. DC.) may be regarded as nearly related to *Kohautia nagporensis*, though the former has comparatively much larger corolla and the inflorescence consists of a smaller number of flowers. Similarly the true *Kohautia senegalensis* (Cham. et Schlecht) Hiern (in Oliver's Fl. Trop. Afr. 3:56, 1877) which does not occur in India, differs from *K. nagporensis* not only in having much larger flowers, but also in the 'monopodial' part of the inflorescence, bearing flowers only in parts, one sub-sessile and the other provided with a spurious pedicel which may reach a length of 6 mm; this pedicel is in reality a one-flowered branch of a dichasium. In *Kohautia nagporensis*, the branches of the inflorescence are true monochasia, and here we find therefore not a single flower at each node.

Leptodermis lanceolata Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2: 191, 1824; Hk. f. in FBI. 3: 198, 1881; Som Deva in Bull. Bot. Surv. India 10 (2): 180, 1968.

A shrub, 1-2.6 cm high. Leaves foetid when crushed, opposite (or somewhat whorled), petiolate, very variable, usually lanceolate, 15-12 \times 0.4-3.7 cm. Flowers 4-6 merous in bracteate heads which are disposed in large terminal panicles. Bracteoles cuspidate, connate to form an involucre. Corolla white or pinkish-purple or white with brownish-purple tube, funnel-shaped 5-lobed, 1.5 cm long. Stamens 5, filaments short. Ovary 5-celled, ovule solitary in each cell, style long, slender, 5-branched

at top. Capsule cylindric, about 5-6 mm long, splitting at top in 5 valves, dry and dehiscent fruits remaining long on the plant.

Near Rajpur, *Raizada*; *Som Dey* 681; Sahasradhara, *Som Deva* 1092; Sahasradhara, *S. K. Malhotra* 18129, 31292.

Fl. June-Sept. *Fr.* Oct.-Jan.

Distribution:—Temperate Himalaya 1200-3000 m, from Kashmir to Bhutan.

Meyna laxiflora Robyns in Bull. Jard. Bot. Etat. Bruesse 11: 228, 1921; Santapau in Bull. Bot. Surv. Ind. 3:20, 1961 and Fl. Khandala 118, 1967. *Vangueria spinosa* Hk. f. in F.B.I. 3: 136, 1881 (omnes partim); *Raizada* in Journ. Ind. Bot. Soc. 14 (4): 154, 1935.

A deciduous thorny shrub. Leaves 5-12 cm long, 3-6.5 cm broad, ovate, pubescent on both surfaces; petiole 1-2 cm long. Flowers greenish, long pedicelled, small, globose on short peduncled, lax cymes which are axillary or supra-axillary; buds tapering gradually upwards, obtuse at apex. Fruit a globose drupe up to 2.5 cm in diameter, with 3-6 smooth 1-seeded stones,

Mandhauria, Gorakhpur district, *Har Sukh* 22349. Domakhand, Gorakhpur, *Divisional Forest Officer, Gorakhpur*; Tekri forest, Gonda division, *Sri Ram Dehra Dun Herb.* No. 52050.

Fl. April-May. *Fr.* Oct.-Nov.

Distribution:—From Northern Bengal to Kanara, Burma, Java.

Robyns. l. c. p. 227 has separated *M. laxiflora* from *M. spinosa* on the following characters:

Flowers always in lax cymes, which are distinctly pedunculate, the individual flowers being long pedicellate; buds tapering gradually upwards, obtuse at apex; petiole 1 cm long. *laxiflora*

Flowers mostly gathered in fascicles, rarely arranged in axillary cymes; pedicels short; buds upwards abruptly rounded distinctly apiculate at the apex; petioles always less than 1 cm long. *spinosa* et al.

Oldenlandia pseudocorymbosa (Bakh. f.) *Raizada com. nov.*; *Hedyotis pseudocorymbosa* Bakh. f. in Blumea 12:62, 1963 et in Fl. Java 2:286, 1965; *Hedyotis burmanniana* Wall. (Cat. No. 868, 1829, pro parte, nom. nud.) ex Wt. & Arn. Prodr. 415, 1834 (non. Schult. 1827; non. *O. burmanniana* G. Don, 1834) *Oldenlandia corymbosa* sensu Hook. f. in Fl. Brit. Ind. 3:64, 1880 (non Linn. 1753), pro parte.

An erect or decumbent-ascending, annual herb. Stems slender brown-tinged, subterete, rarely 4-angular, shortly scabrid, up to 30 cm tall or more. Leaves linear-lanceolate, acute or sharply so, narrowed to base into a 0.2-0.4 cm long petiole, scabrid on the revolute margin, glabrous, shortly scabrid-hairy, pale green beneath, $1.4 \times 0.08-0.2$ (0.3) cm; stipules-segments 2-3, subulate, 0.05-0.1 cm long. Flowers in 1-3-flowered, scabrid, axillary cymes; peduncels very slender, erecto-patent, 0.2-1.5 (-2) cm long; pedicels very slender, erecto-patent, 0.3—1.5 cm long. Calyx-teeth ovate-triangular, acute, 0.05—0.06 (-0.1) cm long, scabrid; corolla white, 0.12—0.15 (-0.2) cm long, lobes oblong; stamens exserted, inserted in the throat; style exserted. Fruit ovoid, narrowed towards apex, with a cup-shaped top, more or less broader than long, $0.2 \times 0.25-0.3$ cm. Seeds minute, reddish-brown.

Bindal, Dehra Dun C. R. Babu 34745; Rispana, Dehra Dun C. R. Babu 33425; common in grassy sandy localities, dry fields and field borders.

Distribution.—Madras without definite locality, Wallich (Wight) 868. (Cal.)

This species is closely allied, and, indeed lumped under *O. corymbosa* Linn. by Hook. f. (loc. cit.) but can be distinguished by short hairy subterete stems, 1-3 flowered cymes, with very slender peduncles, exserted stamens and style and ovoid fruit with a pyramidal apex. Though, often varied in hairiness, shapes of stems, shape and size of leaves and number of flowers in each cyme, the characters-exserted stamens and styles and shape of fruits are quite constant and characteristic.

It may be pointed out that this may be yet another cytotype of *O. corymbosa* Linn.

The nomenclature of the plant is very intricate, as the original Wallichian material, upon which it is based is composed of two different elements—*O. corymbosa* Linn. and *O. pseudocorymbosa* (Bakh. f.) Raizada. A critical study of 3 Wallichian duplicate specimens of No. 868 in Herb. Calc., shows that out of 3 specimens, one (a) belongs to *O. corymbosa*, and second one (b) which the author propose as *O. pseudocorymbosa*, is the true *Hedyotis burmanniana* Wall. and the third one (c) is composed of both *O. corymbosa* and *O. pseudocorymbosa*.

A critical study of the description of *O. burmanniana* G. Don, (Gen. syst. 3:529. 1834 (Nov.)) which is the legitimate, second oldest binomial for this plant shows that it covers only the characters of *O. corymbosa*, and might have been probably based upon Wallichian specimens belonging to *O. corymbosa* Linn. Therefore *O. burmanniana* G. Don, should be relegated to

synonymy of *O. corymbosa* Linn. *Hedyotis burmanniana* Wall. ex Wt. & Arn. (Prodr. 415, 1834 (Oct.)) is the oldest name of this plant, but illegitimate by being a later homonym of *H. burmanniana* Schult. (1827), and hence should be rejected according to Art 64 of ICBN (1966).

Backer & Bakh. f. (loc. cit.) maintained this as a distinct species, and proposed the name *Hedyotis pseudocorymbosa* by the later author for this plant, which is the correct name for this interesting taxon under the genus *Hedyotis*.

The author therefore, proposes the above new combination with *Hedyotis pseudocorymbosa* Bakh. f. as its basionym.

Paederia scandens (Lour.) Merr. in Contr. Arn. Arb. 8:163, 1934; Back. and Bakh. f. Fl. Java 2:347, 1965. *Gentiana scandens* Lour. Fl. Coch. 1:171, 1790. *Paederia tomentosa* Bl. Bijdr. 968, 1826, *Paederia foetida* auct. non Linn.; Hk. f. in F.B.I. 3:195, 1881; Raizada in Journ. Ind. Bot. Soc. 14(4):154, 1935.

A slender glabrous climber, foetid when bruised. Leaves opposite 5-9 cm long, 2.5-7 cm broad, ovate-lanceolate. Stipules early deciduous 0.3-0.4 cm long. Flowers in axillary and terminal 2-3-chotomously branched paniced cymes, 5.15 cm long, puberulous; bracts often foliaceous. Corolla 10-12 mm long, dingy purple. Pyrenes black with a broad pale wing.

Dehra Dun *G. A. Gammie*; Bindal Nala, Dehra Dun, Hole Dehra Dun Herb. No. 21187; Mothronwala, Dehra Dun Gupta Dehra Dun Herb. No. 45150; Robber's Cave C.R. Babu 35455.

Fl. May-Oct.

Distribution:-- From the Central & Eastern Himalaya Southwards to Malacca and Westwards to Calicut; Malaya Arch., Borneo, China & Japan.

Randia tetrasperma Roxb. ex Hk. f. in F.B.I. 3:108, 1880; Som Deva in Bull. Bot. Surv. India 10(2):180 1968. *Hemalrandia tetrasperma* (Wall. ex Roxb.) Yamazaki in Journ. Jap. Bot. 45:340, 1970. *Aidia tetrasperma* (Roxb.) Yamazaki in Fl. E. Himal. 307, 1966. *Gardenia tetrasperma* Wall. ex Roxb., Fl. Ind. ed. Carey 2:55, 1824.

An unarmed stiff shrub up to 2.3 m high. Leaves crowded towards the ends of the branchlets, obovate or oblanceolate, 1-5 cm, long. Flowers sessile at the ends of the branchlets. Corolla greenish-white, about 1.5-1.7 cm across. Berries green, globose, about 7-8 mm in diam., 4-seeded.

Bakh. f. Fl. Males. (Ser. 1) 4: 254, t. 1, 1961; Backer & Bakh. Bindal, Dehra Dun C. R. Babu 33227; Robber's Cave Som Deva 384; near Rajpur Raizada; Som Deva 1563; Sahasradhara, Som Deva 2388.

Fl. March--Sept.

Distribution:—Western Subtropical Himalaya, from Kashmir eastwards from 1320-1980 m; and up to 2300 m in Sikkim and Bhutan.

Richardia scabra Linn. Sp. Pl. 1:330, 1753; Naresh Bahadur et Naithani in Indian For. 99(7): 449-453, 1973.

Perennial or annual herb, densely pilose, hispid or hirsute with whitish tap root. Stems having long internodes and forming open mat, 4-angular. Leaves usually subsessile, ovate to oblong, lanceolate, thickish and brittle, acute at apex and narrowed at base, 2-5 cm long and 1-2 cm wide, with midrib and nerves impressed above and thickened beneath and covered with short stiff hairs, hispidulous throughout and along margin; stipules 2 mm long; connate, cupular with setiferous appendages, ciliate. Flowers 30 or less in a terminal sessile, congested, capitate clusters, with setiform bracts at base, entire cluster subtended by 2-4 leaf like ovate, reniform bracts slightly paler towards the base. Calyx 1-1.5 mm long, ciliolate, acute, with 6 subequal lobes, persistent, rotate, ca 5 mm in diam., Corolla funnel shaped, limb 6-fid, 8 mm long, glabrous except for a ring of hairs with in 2 mm above the base, tube white and lobes acute, pinkish; stamens 6-8, erected filaments ca 1 mm long, capillaceous, glabrous, white; anthers erect, dorsifixed or versatile, ovate, acute, bilocular, white, ovary subglobose, tricarpeal, scabrous, densely papillo-sely pilose, style filiform, white, glabrous, apex trifid; stigmas 3, oblong-capitate, glandulose, pubescent. Capsule 3-celled, densely papillose hairy, light brown; carpel rounded on outer surface, inner surface slightly concave, seeds 3, one in each cell, oblong, obovate, yellowish, minutely hispid or smooth.

Flowering & Fr. Feb.--Oct.

H.B. Naithani 1527 & 1537 New Forest, Dehra Dun (March & June 1970 respectively).

Distribution:—India (Uttar Pradesh, Bihar, Assam, Andhra Pradesh, Karnataka & Rajasthan), America, Hawaiian Islands, Australia, Java, Burma, Sri Lanka and Africa.

This plant is a native of tropical America and is of recent introduction.

VALERIANACEÆ

Valeriana hardwickii Wall. in Roxb. Fl. Ind. Ind. (ed. 1) 1:166, 1820; C.B. Clarke in Hk. f. FBI. 3: 213, 1881; Backer and

Bakh. f. Fl. Java 2: 361, 1965; Collett, Fl. Sim. 237, t. 73, 1902; S. K. Malhotra in Maharashtra Vidhyan, Mander, Patrika 6 (1):41, 1971.

An erect herb, 0.3-1.6 cm high. Radical-leaves long-petiolate, ovate, soon disappearing; cauline-leaves opposite, odd-pinnate and deeply pinnatifid; leaflets 3-9, ovate to oblong-lanceolate, usually entire, terminal segments largest, petiolate, lateral ones subsessile. Flowers in compound corymbs, forming a long terminal lax panicle. Corolla white, about 1.5-2 mm long. Fruit ovate-oblong, compressed, with 3 dorsal, 1-ventral and 2 marginal ribs, hairy on one side or both, crowned with long plumose calycinal bristles.

Sahasradhara, along moist rocky slopes, S. K. Malhotra 34837.

Fl. & Fr. Aug.-Nov.

Distribution:—Temperate Himalaya from Kashmir to Bhutan, 1200-3600 m; Khasi Mts., Continental S.E. Asia, Sumatra, Java.

This species is common in Mussoorie along waysides and in forest undergrowth, 1500-2100 m: Barlowganj, Kapte Road, Cloud End etc. I greatly doubt if it descends to the base of Sahasradhara and must have been collected from a much higher altitude above 1000 m.

COMPOSITÆ (Asteraceae)

Acanthospermum hispidum DC. Prodr. 5: 522, 1836; Gamble, Fl. Madr. 2 (4): 704, 1921; Santapau in Bomb. Nat. Hist. Soc. 43: 445, 1945; Adams in Hutchinson & Dalziel, Fl. W. Trop. Africa (ed. 2) 2: 241, 1963; Stuessy in Rhodora, 72: 106, 1970. *Acanthospermum australe* sensu Raizada and Sharma in Ind. For. 88 (5): 364, 1962, non Kuntze Rev. Gen. 1:303, 1891; Singh in Curr. Sci. 42 (2): 68, 1973.

An erect hispid herb. Stems 30-40 cm high, dichotomously branched, hairy. Leaves 1.5 cm long, ovate, with 3 prominent veins, cuneate at base, sub-dentate from middle upwards, sub-hispid. Heads heterogamous, solitary in forks of stem, many-flowered; ray florets uniseriate, disk florets tubular, yellow. Outer palae armed externally with hooked prickles. Achenes 4-5, radiating from centre, compressed, prickly, with a pair of horn like spines at the top. Pappus O.

An introduced weed of recent years, now common in waste lands especially about villages in various parts of Ajmer, V. S. Sharma 94, 631, 1078, 1352. Lucknow Awasthi 2927; Raizada s.n.; Mirzapur Bhattacharya 13634; New Forest,

Dehra Dun H.B. Naithani 5; Ridge, New Delhi, Raizada; Maheshwari 5488.

Fl. & Fr. Aug.-May.

Distribution.—Native of South America, a pest in East Africa; naturalized in tropical countries (India-Andhra Pradesh, Tamil Nadu; Orissa, Delhi, Rajasthan, Madhya Pradesh, Himachal Pradesh, Uttar Pradesh (Almora & Pauri Garhwal etc.)). It is becoming a weed of great concern like *Xanthium strumarium* DC.

The plant is not eaten by live stock. Fruits distributed by sheep & cattle.

Acanthospermum hispidum DC., is related to *A. australe* (Loefl.) Kuntze, but differs in having larger leaves 5-8 cm long, softly hairy on both surfaces, peduncle short, flowers yellow, fruit triangular, broader at apex and narrower at base, apex with 2 prominent 3 mm long straight prickles, upper prickles straight lower ones hooked, 1.5-2 mm long; while in *A. australe* (Loefl.) Kuntze, the leaves are shorter, 2 cm long, glabrous, densely punctate on both sides with minute oil glands peduncle 8 mm long, flowers dull white, fruit elliptic-oblong, prickles thin, all hooked, 1 mm long.

Adenostemma lavenia (L.) O. Ktze. Rev. Gen. Pl. 304, 1891. *Verbesena lavenia* Linn. Sp. Pl. 902, 1753. *Adenostemma viscosum* Forst. Charact. 90, 1776, var. *elata* Hk. f. in FBI. 3: 242, 1881. *A. lavenia* (L.) O. Ktze. var. *elata* Kitamura.

An erect rarely decumbent annual, glabrous, pubescent or viscidly pubescent. Leave sessile or petioled, opposite or the upper alternate, broadly ovate, or cordate, nearly glabrous, serrate. Heads few or many, on lax or dense panicles or corymbs, homogamous; receptacle flat, naked; corolla all equal, tubular, regular; tube short, limb campanulate, 5-toothed; bracts oblong, obtuse or acute, glabrous, glandular or scabrid. Achenes obtuse, 5-ribbed, sparingly warted, pappus hairs 3-5, short, rigid, often clavate, inserted in a short ring.

Asarori, Dehra Dun distr. Raizada; Som Deva 1262, Thano, Som Deva 3001.

Fl. Aug.

Distribution.—Throughout India ascending the Himalaya and other ranges.

The above is referable to var. *elata* Kitamura.

Adenostemma macrophyllum (Bl.) DC. Prodr. 5: 113, 1836; Koster in Blumea 1:470, 1935; Backer & Bakh. f. Fl. Java

2: 376, 1965. *Lavenia macrophylla* Bl. Bijdr. 905, 1826; Hk. f. in FEI. 3: 242, 1881 (pro syn.)

A herb, annual-perennial, decumbent-ascending, often rooting below. Stems glandular-hairy at the top, lower down glabrous. Leaves ovate-lanceolate-oblong, obtuse or acute, with a narrowed base, serrate in the upper part, slightly rugose, glabrous, 5-15 (-20) × 2-10 cm. Heads 0.8-1 cm across, in many headed corymbs; peduncle 0.5-1.5 cm long, involucre 0.5-0.6 cm long, with oblong-subspathulate ciliate bracts; corolla 0.25-0.3 cm with a campanulate tomentose limb; style arms 0.35 cm long; achenes oblong, slightly curved, glandular hairy at first, smooth 0.3 cm long; pappus at .3 cm long 2-4 setae.

Robber's Cave, Dehra Dun, C. R. Babu 32095, common in marshy localities.

Fl. & Fr. July-Nov.

Hooker f. (loc. cit.) treated it as a synonym of *A. viscosum* var. *parviflorum* (Bl.) Hk. f., Koster (l.c.) recognised it as a distinct species. This has been adopted by Backer & Bakh. f. (loc. cit.). The smooth achenes, larger involucre, bigger heads and longer corolla of this remarkable species will distinguish it from *A. lavenia* (L.) O.K., which is characterised by tuberculate achenes, shorter involucre, smaller heads and shorter corollas. These differences between these two closely related taxa are so marked and constant that may be justified to maintain this as distinct species.

Ageratum houstonianum Mill. Gard. Dict. (ed. 8) n. 2, 1768; Koster in Blumea 1: 490, 1935; Hara in Fl. East Himal. 330, 1966; Raizada & Saxena in Journ. Bom. Nat. Hist. Soc. 64 (1): 82, 1967; Jonson in Ann. Miss. Bot. Gard. 58 (1): 21, 1970; *A. mexicanum* Sims, Bot. Mag. t. 2524, 1825; Hoffman. Pfm. 4: 137, 1894; *A. conyzoides* L. var. *mexicana* DC. Prodr. 5: 108, 1836. *Carelia houstoniana* (Mill.) Kuntze, Rev. Gen. 1: 325, 1891.

A herb, 16-60 cm high. Leaves opposite, petiolate, deltoid, (upper ones ovate), lamina 2-10 cm by 1.5-5.5 cm, crenate-serrate or serrate. Heads discoid, 80-100 flowered, in terminal and axillary dense corymbs. Involucre biseriate, glandular, greyish, hirsute. Corolla violet, infundibuliform, 2.5-3.5 cm long. Style branches long, exserting the corolla. Achenes 5-angled, black, hairy, about 2 cm long; pappus-scales 5, serrate, awn-tipped.

Common in waste places at Rajpur etc. Saxena 201, 50; Hardwar Road, Dehra Dun H.B. Naithani Ser. II No. 82; Raizada s.n.; Robber's Cave, C.R. Babu 32051.

Fl. & Fr. Nov.—March.

Distribution :—Throughout India ascending to 1800 m. (Tamil Nadu, Assam, Nilgiri & Pulney Hills, Sikkim, Dehra Dun, Mussoorie, Punjab, Madhya Pradesh, Nepal, Bengal etc.), most tropical countries of the world. It is a native of Mexico.

This species is very similar to *A. conyzoides* and perhaps a variety of it, but is easily distinguishable by many-flowered, linear heads, linear setaceous, densely hairy involucre bracts and larger corollas.

Ainsliaea latifolia (D. Don) Sch.-Bip. in Pollichia 18-19: 169, 1861; Kihara, Fauna & Fl. Nepl. 243, 1955; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 6(1):41, 1971; *Liatris latifolia* D. Don Prodr. 169, 1825. *Ainsliaea pteropoda* DC., Prodr. 7:14, 1838; Hk. f. in F&B 3: 388, 1881; Collett, Fl. Sim. 277, 1902.

An erect perennial herb. Leaves chiefly radical, with long winged petiole, broadly ovate, 5-15 cm long (including petiole) and 1-6 cm broad, finely toothed; cauline-leaves sessile, linear-oblong or oblanceolate, finely toothed, densely pubescent or white-tomentose beneath. Heads discoid, narrow, 1.3-1.5 cm long on long spikes, rarely clustered. Involucre bracts many, inner ones long, outer shorter. Florets 1-4, usually 3 in a head, white or tinged with pink. Pappus feathery.

Along rocky slopes of Sahasradhara, S.K. Malhotra 19176. Fl. & Fr. Jan.—Apr.

Distribution:—Temperate Himalaya, 1800-2400 m, Khasia Mts., Burma.

This species is common along wayside and shady places or in forest, 1500-2200 m in Mussoorie: Camel's back Road, Barlowganj, Cloud End etc. It is very unlikely that it descends as low as at base of Sahasradhara. Malhotra must have collected it from the slopes of Sahasradhara hills above 1100 m.

Ambrosia artemisifolia Linn. Sp. Pl. 988, 1753; var. *elatio*r Descourtils; Backer & Bakh. f. Fl. Java 2:399, 1965; *A. elatio*r Linn. Sp. Pl. 987, 1753; Panigrahi & Kar in Bull. Bot. Surv. Ind. 8 (3 & 4): 229, 1966; Ibrahim Hussain & S.L. Kapoor in Journ. Bom. Nat. Hist. Soc. 67(3): 619, 1970.

An annual herb. Stem furrowed, glabrous or pubescent. Leaves petioled, in outline more or less triangular, 2-3—pinnatifid, with narrow segments, on both surfaces. appressed—pubescent, 5-10 cm excluding the petiole, 2-4.5 cm broad, higher ones smaller and less divided; petiole with a cuneate base, 0.3-0.5 cm long. Male heads nearly spherical, 5-20—flowered, on short, filiform peduncles, in long thin spikes about 4 mm in diam.;

involucre gamophyllous, patelliform, dentate, herbaceous, receptacle flat, with or without pales; corolla tubular-funnel-shaped, 5-dentate at the apex; anthers free, with an obtuse base and filiform incurved apex; ovary and style rudimentary. Female heads lower-down, 1-flowered, sessile in the axils of higher leaves or bracts, solitary or clustered; involucre gamophyllous, entirely enclosing the achenes, with prickles (free tops of the involucre bracts), beaked; corolla wanting; style arms long, far exserted; achenes 4-5 mm long, obovoid or ellipsoid, tipped by 1-2 mm long, 2-toothed beak. Pappus 0.

Daliganj, Lucknow *Hira Lal* 99050. *Kheri Panigrahi*.

Distribution :—In India reported by Panigrahi et al (loc. cit.) from Kheri and Jaintea hills (Assam). Now naturalised in shillong. Native of America, also occurs in Java.

Anaphalis busua (Buch.—Ham. ex D. Don) DC. Prodr. 4:275, 1838; Hand.—Mazzttii Symb. Sin. 7:1104, 1936 et Notizbl. Bot. Gart. Berlin 13:631, 1931; Hara, Fl. E. Himal. 331, 1966; Kitamura in Acta Phytotax. Geobot. 23:6, 1968; *Gnaphalium busua* Ham. in D. Don. Prodr. 173, 1825; *Anaphlis araneosa* DC. Prodr. 6:109, 1838; Hk. f. in FBI. 3:283, 1881; Raizada in Ind. For. Rec. (n.s.) Botany 4(3):67, 1956.

An erect usually tomentose herb, 30-90 cm high. Leaves sessile; radical oblanceolate, cauline linear, 2.5-5 by 0.2-3 cm, margins often recurved, upper surface green, lower white or grey-tomentose. Heads discoid, numerous in broad terminal corymbs. Involucral-bracts scarious, shining white, multiseriate; florets white or dull-yellowish. Achenes minute. Pappus of hairs,

Robber's Cave, Dehra Dun *Raizada* Dehra Dun Herb. No. 188456; New Forest, *Raizada* Dehra Dun Herb. No. 100984 and 100985 Robber's Cave, C. R. Babu 34931; Rispana, C.R. Babu 35419.

Fl. & Fr. Sep.-Dec.

Distribution :—Temperate Himalaya, 1500-3300 m, Khasi mountains; China.

Another species *A. contorta* (D. Don) Hk. f. is likely to occur on cliffs of Robber's Cave—hills.

Anthemis cotula Linn. Sp. Pl. 894, 1753; Hk. f. in FBI. 3:312, 1881; Dunn in Journ. Linn. Soc. Lond. Bot. 39:418, 1911.

An erect somewhat foetid annual herb. Stems often decumbent below, hairy, simple below, corymbosely branched at the top. Leaves sessile, 2-3—pinnatifid, 2-5 cm long, hairy, with linear, dentate or pectinately pinnatifid segments, teeth

mucronate, 0.3-0.4 cm long. Heads solitary, terminal, confined into leafy corymbs, 1.5-2 cm across; peduncles 0.6-1.5 cm, involucre bracts 2-seriate, lanceolate-oblong, sub-obtuse, hairy, 0.35-0.4 cm; ligules white, shortly obtusely 3-toothed; 0.6-0.65 cm; corolla of disk-flowers 0.3 cm long, glabrous; achenes subterete, turbinate, 8-10—ribbed, tuberculate on ribs, 0.15-0.2 cm long; pappus wanting; receptacle convex, with 0.2-0.25 cm long linear subulate pales.

Rispana, Dehra Dun, C R. Babu 35253. Naturalized in waste places and road-sides.

Fl. & Fr. April-June.

Distribution :—Native of Europe and continental Asia.

Hooker f. (loc. cit.) recorded this species from the doubtful locality, Scind. He further stated that he has not seen any specimen from Scind, and expressed that the specimen he examined (Stocks) might have probably been collected from Baluchistan.

Artemisia parviflora Buch.-Ham. ex D. Don, Prodr. 181, 1825; Roxb. Fl. Ind. 3: 420, 1832; Hk. f. in FBI. 3: 22, 1881; Raizada in Proc. Nat. Inst. Sc. Ind. 24(4):200, 1958.

An erect perennial herb, 30-90 cm high. Stem hairy or glabrous or occasionally slightly tomentose. Leaves obovate-oblong or wedge-shaped, 2.5-7.5 cm long, the margins usually entire, tip broad, toothed or lobed; lower leaves sessile, upper sessile or petiolate. Floral leaves similar but smaller, often lobed nearly to the base, sometimes lanceolate; heads discoid, 1.75-2 mm in diameter in large terminal leafy panicked racemes. Involucre bracts few-seriate with scarious margins, the outer shorter. Florets yellow. Achenes minute. Pappus none.

Dehra Dun, King; New Forest, Dehra Dun Raizada Dehra Dun Herb. No. 123198; Occasional in open places at Rajpur, Raizada.

Fl. & Fr. August-Sept.

Distribution :—Hilly districts throughout India 900-3000 m, Burma.

Athroisma laciniatum DC. Prodr. 5: 369, 1836 et in Guill. Arch. Bot. 2: 517, 1883; Hk. f. in FBI. 3: 276, 1881; Haines in Bot. Bih. & Orissa 2: 497, 1961 (Rep. ed.); Backer & Bakh. f. Fl. Java 2: 392, 1965; Srivastava in Journ. Bom. Nat. Hist. Soc. 53: 152, 1951.

A viscid, glabrous, papillose or pubescent herb with ascending branches 15-45 cm long. Leaves 3.5-6 cm long, alternate, petioled, pinnatifid; segments oblong, toothed, or lobulate.

Compound heads globose or ovoid-oblong, up to 1.25 cm long, on short clavate peduncles, individual heads ovoid, receptacle furnished with broad dry pales enclosing the flowers and 1-2 involucre bracts like the pales. Outer flowers female, very few, filiform; hermaphrodite flowers several with campanulate shortly 4-fid limb. Cypsel about 1.2 cm, tuberculate with shortly woolly margins.

Mirzapur, *Srivastava* (specimen not seen/examined.)

Fl. & Fr. April-May.

Distribution :—Bengal, Assam, Bihar, Burma, Java.

Bidens bipinnata Linn. Sp. Pl. 832, 1753; Sherff in Field Mus. Publ. Bot. 16: 366, 1937; *Bidens decomposita* Wall. ex DC. Prodr. 5: 602, 1836. *Bidens pilosa* var. *bipinnata* (Linn.) Hk. f. in FBI. 3: 309, 1881. *B. pilosa* var. *decomposita* (Wall. ex DC.) Hk. f. in FBI. 3: 310, 1881.

An erect, simple or much branched annual herb up to 15-150 cm tall. Stem 4-gonous, glabrous. Leaves opposite, rarely upper ones alternate, 2-3-pinnatipartite or pinnate, 4-20 cm long, segments ovate-lanceolate, acute or acuminate, incised-serrate to lobulate, thinly hairy. Heads yellow, on ebracteate, 1-8 cm long peduncles, 0.6-0.8 cm across; outer involucre bracts linear spatulate, 0.25-0.26 cm long, inner ones ovate-lanceolate, obtuse, 0.3-0.35 cm; marginal flowers 2-4, with 2-lobed corollas; disk flowers 0.3 cm; achenes 4-angular, tapering towards the apex, glabrous or shortly hispid, 0.2-0.6 cm long; pappus-setae 2-4, retrose bristly, 0.25-0.3 cm long.

Dehra Dun, common in waste places, road sides, gardens, fields, forest-edges and way-sides *Raizada*; Bindal, *C.R. Babu* 32030.

Fl. & Fr. March-Nov.

This species is closely allied, and in fact much confused in the various Indian Floras and herbaria with *B. biternata* (Lour.) Merr. & Sherff ex Sherff (in Bot. Gaz. 88: 293, 1928 et in Field Mus. Publ. Bot. 16: 138, 1937), but is easily recognisable by its 2-3-pinnate leaves, whereas *B. biternata* is characterised by imparipinnate or rarely 2-pinnate leaves and which perhaps may not occur in India at least in N.W. Himalaya.

Carpesium abrotanoides Linn. Sp. Pl. 86, 1753; Hk. f. in FBI. 3: 301, 1881; *Raizada* in Journ. Ind. Bot. Soc. 14 (4): 155, 1935; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 180, 1968.

An erect nearly glabrous or pubescent stout herb, 0.3-1.3 m high. Leaves sessile or petiolate, lanceolate, 5-20 × 1-3 cm, narrowed at both ends, entire or remotely serrate. Heads

numerous discoid, 4-5 mm across inserted along the whole length of the branches, axillary or sessile or shortly stalked or crowded in short erect axillary racemes. Inner involucre bracts dry, outer often green but shorter. Florets yellow. Pappus none.

Dehra Dun, Duthie 10698; Sahasradhara Som Deva 2870, Raizada sn.

Fl. & Fr. Sept.-Nov.

Distribution:—Temperate Himalaya from Kashmir to Sikkim-North Persia to Australia, Japan and China.

Carthamus lanatus Linn. Sp. Pl. 830, 1753; Hk. f. in FBI. 3: 386, 1881; Kitamura in Fl. Afgh. 395, 1960; Hanelt in Fedde, Rep. 67: 41-180, 1963.

An erect, annual herb, 20-60 cm tall. Stems simple below, patently corymbosely branched at the top, cottony or glabrate. Basal leaves petioled, oblong, pinnatifid with dentate-lobed, spiny segments, 8-15 cm long, higher ones ovate-lanceolate, with a semi-amplexicaule base, spiny lobed, cottony on both surfaces, glandular beneath, with prominent nerves, $3.4 \times 0.4-0.7$ cm. Heads solitary, sessile, 6-8 cm across; outer involucre dentate top 2-2.5 cm long; corolla yellow with purplish veins, about 3 cm long, lobes glabrous, filaments medianly bearded; achenes obliquely obovoid, with a truncate apex, 4 angular, dark brown, with an excentric scar of insertion, 0.4×0.25 cm; pappus-scales 3-4-seriate, unequal, lanceolate-setaceous, silvery, ciliate, 0.3-0.8 cm long, often wanted in marginal achenes; receptacle slightly convex with 0.7-0.8 cm long filiform pales.

Bindal, Dehra Dun, C.R. Babu 35251, 35271.

Fl. & Fr. May-July.

Probably a native of S. W. Asia, and an accidental introduction to India; hitherto known from Kashmir only in India.

Munz (Calif. Fl. 1271, 1959) distinguished *Cnicus* from *Carthamus* by excentric scar of achenes, in which respect the above plants resemble the genus *Cnicus* rather than *Carthamus* which is characterized by horizontal scar of achenes and flat receptacles. Further, a chromosomal count of the above plant gives $2n=44$, a number which coincides with the rare number of *Cnicus* rather than with base number of *Carthamus* which is 12.

Carthamus oxyacantha Bieb. Fl. Taur. Cauc. ii, 283, Hk. f. in FBI. 3: 386, 1881.

A thistle-like herb. Stem and branches white, leaves alternate, rigid, spine-cent, oblong or oblong-lanceolate, lower shortly spinulose-toothed, upper half amplexicaule, very spinous; outer involucrel bracts exceeding the head, white below the contracted portion, green above it with yellow spines; flowers all bisexual, fertile and similar, orange-yellow. Achenes obovoid, 4-angled, smooth, shining, truncate at the top with 4 bosses; pappus O.

Saharanpur, *Raizada* s. n.; Bulandshahr Dist.: Lakhaoti, *N.P. Singh* 19619; Dadri *N.P. Singh* 25532; Pipli, Saharanpur Dist. *M.A. Rau* 1176; Hardwar *H.B. Naithani* 6916; New Forest Dehra Dun, *H.B. Naithani* 6921.

Fl. & Fr. cold season.

Distribution :—The Punjab from Lahore westwards; westwards to Caucasus.

Cichorium intybus Linn. Sp. Pl. 813, 1753; Hk. f. in FBI. 3:391, 1881.

The Chicory or Succory (vern. Kasni) mentioned by Duthie in his Flora as being cultivated to a certain extent and occasionally met with as an escape, is now completely naturalized and is common in clover-fields and fallow fields in Dehra Dun and other places.

Rispana, Dehra Dun, *C.R. Babu* 35260; New Forest, Dehra Dun *H.B. Naithani* 3627.

It is a native of Europe, N. Africa and Continental Asia.

Fl. & Fr. Feb.-May.

This species is very similar and hardly distinguishable from *C. endevia* Linn., also a native of Mediterranean Region, but said to be recognized by very short pappus-scales; whereas *C. endevia* Linn., is characterised by 0.5 cm long pappus scales whereas in *C. intybus* the pappus scales are 0.2 cm long.

Cirsium argyranthum DC. Prodr. 6: 640, 1837. *Cnicus argyranthus* (DC.) Clarke Comp. Ind. 218, 1876, excl. var. B: Hk. f. in FBI. 3: 362, 1881; *Raizada* in Journ. Ind. Bot. Soc. 10(1): 156. 1931.

An erect robust herb, 1-2 m high, with rough or cottony stem. Leaves alternate, sessile, irregularly pinnately lobed, margins beset with long rigid spines, glabrous, or cottony beneath, radical leaves stalked and larger. Heads discoid, 2-2.5 cm across, sessile or shortly stalked, crowded in terminal and axillary clusters. Outer involucrel bracts ending in long rigid spines. innermost linear, long-pointed. Flowers pale-yellow or white. Pappus feathery, united at base.

New Forest, Dehra Dun, *Raizada*, In damp waste places.

Fl. & Fr. May-Sept.

Distribution.—Temperate Himalaya from Pakistan to Bhutan.

Cirsium wallichii DC. Prodr. 6: 643, 1838, var. *fasciculatum* (Hook. f.) Raizada *com. nov.*; *Cnicus wallichii* (DC.) Hk. f. var. *fasciculata* Hk. f. in FBI. 3: 364, 1881.

New Forest, Dehra Dun, *Raizada s.n.*; *H. B. Naithani* 5563; Robber's Cave, Dehra Dun, *C.R. Babu* 32093; Dehra Dun *Royle, Duthie*.

The plants occurring in Dehra Dun are referable to this variety. The var. *fasciculatum* differs from the type in being very spinous; leaves white-tomentose or cottony beneath; heads fascicled; inner involucre bracts with long lanceolate dilated spinescent tip.

Crassocephalum crepidioides (Benth.) Moore in Journ. Bot. 50: 211, 1912; *Gynura crepidioides* Benth. in Hook. Niger. Fl. 438, 1849; Bor in Curr. Sci. 7: 116, 1938; Raizada in Ind. For. Rec. (n.s.) *Botany* 4 (3): 67, 1950.

An erect succulent usually much branched annual herb about 33-52 cm high. Stem and branches pubescent or nearly glabrous. Leaves alternate, spatulate, usually deeply lyrate-pinnatifid, sometimes not lobed, mostly petiolate, the upper ones rarely sessile, 2.5-15 cm long, on long slender pedicles, in a dense or lax corymbose cyme, rarely solitary. Disk hairy with filiform bracts below. Involucre bracts about 15, linear-subulate, glabrous or slightly sullose. Florets all tubular, hermaphrodite or rarely a few outer ones female; limb 5-toothed. Corolla orange-yellow, or tinged with purple, shorter than or equalling the pappus. Style-branches slender, tips long, subulate, hispid. Anther-bases entire or subauricled. Achenes narrow, many ribbed. Pappus hairs copious, fine, white.

In Dehra Dun it made its appearance about 1940 and is since then invading plantations in New Forest and getting naturalized.

New Forest, Dehra Dun, *Raizada* Dehra Dun Herb. No. 36011.

Fl. & Fr. Cold Season.

Distribution.—A native of tropical Africa found all over Assam, Bengal, Burma, in Bastar, Madhya Pradesh and Kalahande State in Orissa.

Coreopsis tinctoria Nutt. in Journ. Acad. Philad. 2: 114, 1821; Sherff in Field Mus. Nat. Hist. Bot. Ser. 11: 417, 1936.

An erect, much branched, aromatic, annual herb. Stems glabrous, often dark-purple-tinged. Leaves 2-3-pinnatipartite

or 2-3-pinnate, upper ones simple, segments linear-lanceolate, glabrescent or glabrous. Heads 2-3 cm across on 10-30 cm long peduncles, in leafy panicles, outer involucre bracts oblong, inner once ovate-oblong, longer than outer ones; ligule of marginal flowers 3-dentate, yellow with dark-purple blotches or dark purple, 1-1.5 cm long; corolla of disk-flowers 3-5 cm long, red-brown; achenes oblong, 0.15-0.3 cm long; pappus wanting.

Bindal, Dehra Dun, C. R. Babu 34607a.

Established in gardens, road-sides, waste places and sugar-carefields, sometimes cultivated as an ornamental; not yet completely naturalised; native to N. America.

Fl. & Fr. Sept.-Nov.

Cosmos sulfureus Cav. IC. 1: 56, t. 79, 1791; Sherrf in Field Mus. Nat. Hist. Bot. Ser. 7: 401, 447, 1932.

An erect, much branched, aromatic, annual herb. Stems ribbed, glabrescent or glabrous. Leaves 2-3-pinnatifid or pinnate; leaflets or segments lanceolate-oblong, obtuse, apiculate, entire, glabrescent or glabrous, ciliate; petiole 1.5 cm long. Heads 5-8 cm across, solitary on 10-15 cm long peduncles, combined into corymbs; outer involucre bracts linear-lanceolate, acute, o. 4-0.5 cm; inner ones oblong-lanceolate; marginal flowers 1-2 seriate with golden-yellow, 1.8-2 cm long ligules; 1.2-1.5 cm long; achenes fusiform, 4-angular, hispidulous, 1.5 cm long, beaked with 2-3 apical, retrorsely bristly awns; pappus wanting; pales linear, acute.

Cultivated as a garden-ornamental, often met with as an escape in waste places and road-sides; native of Central and S. America. Not yet naturalised.

Bindal, Dehra Dun, C.R. Babu 34607.

Fl. & Fr. Sep.-Dec.

C. bipinnatus Cav. also a native of Central and South America, is frequently cultivated as a garden-ornamental. It can be distinguished from this by filiform pales, long-acuminate involucre bracts, white or purple-red or pink ligules and 2-pinnatifid—2-pinnate leaves.

Cotula australis (Sieb. ex Spreng.) Hook. f. *Fl. Nov. Zeal.* 1855; Dakshini & Vijayaraghavan in *Indian For.* 96(1): 24, 1970; Vaid & Naithani in *Indian For.* 99(6):426. 1970; *Anacyclus australis* Sieb. ex Spreng. *Syst. Veg.* 3: 497, 1826.

An annual, procumbent or ascending, pubescent, much branched, flaccid herb; branches spreading, more or less clothed with long lax hairs or glabrous. Leaves 1-4 cm long by 0.5-1 cm broad, alternate, sessile, oblong in outline, deeply pinnatifid or

bipinnatifid, segments linear, acute or mucronate. Heads solitary terminal, 2 mm high by 3.5 mm in diam., heterogamous, long pedunculate. Involucral bracts in two series, scarious at the margins. Flowers pedicellate, dimorphic; disc florets bisexual, few. Corolla tubular, 4-toothed at the tip. Achenes of the female floret obovate with broad, thick wing, glandular on both surfaces; those of the disc floret much smaller, hardly winged.

Delhi University campus; Lodi Gardens; in shady damp places, *Dakshini* 951, 979.

Fl. & Fr. Nov.-Mar.

Distribution :—Native of Australia and New Zealand. Naturalized in south Indian hill stations, as well as in the Himalaya (Kulu, Simla and Darjeeling); extending to the plains of N. India-Delhi.

Cotula hemispherica (Roxb.) Raizada *comb. nov.*; *Artemisia hemispherica* Roxb. *Fl. Ind.* 3:422, 1832; *Cotula hemispherica* Wall. (Cat. No. 3236, 1831, nom. nud.) ex Benth. and Hook. f. *Gen. Pl.* 2:429, 1873; Clarke *Comp. Ind.* 150, 1876; Hk. f. in *FBI.* 3:316, 1881; Duthie *FUGP* 1:476, 1903.

A prostrate or decumbent-ascending, often multicauline, annual herb. Stems often much branched, glabrous except cottony young parts. Leaves 2-pinnatipartite-2-pinnate, 1.5 cm long, segments linear-lanceolate, entire, with an aciculate tip, glabrous. Heads axillary and terminal, 0.5-0.6 cm across, on 0.3-1.5 cm long peduncles; involucral bracts 2-seriate, slightly connate at base, oblong, acute or obtuse, 0.25-0.3 cm; achenes of marginal flowers brown, viscid, exalate, 0.05-0.06 cm.

Rispana, Dehra Dun, *C.R. Babu* 34666.

Common in dry rice-fields, puddles, ditches and road sides.

Fl. & Fr. Nov.-May.

Specimens from this area are more closely allied to *C. aurea* Linn., in having 2-pinnate or 2-pinnatipartite leaves and in prostrate habit, rather than to *C. hemispherica* which is characterized by erect habit and pinnatipartite leaves. However, these plants differ from the habit of the former in having naked marginal flowers and their exalate achenes, in which respect they resemble *C. hemispherica*.

Since no combination has been based on *Artemisia hemispherica* Roxb. (1832), the earliest binomial which has got priority over *C. hemispherica* Wall ex Benth. and Hook. f. (1873), the author, therefore, proposes the above new combination for this interesting taxon, with *A. hemispherica* Roxb., as its basionym.

Echinops cornigerus DC. Prodr. 6:525, 1837; Hk. f. in FBI. 3:358, 1881; Raizada in Journ. Ind. Bot. Soc. 14(4): 155, 1935.

A tall erect thistle-like herb; stems, branches and lower surfaces of leaves densely white-cottony. Leaves 10-21 cm, pinnately divided into broad, flat, lobed and toothed, spiny segments; upper surface cobwebby. Heads compound, terminal, solitary 5.5-7.5 cm in diameter with or without projecting spines. Outer involucrel bracts numerous, soft, hair-like, about 2 cm long. Achenes long, hairy, crowned with pappus.

Ramgarh, Dehra Dun district, Gupta Dehra Dun Herb. No. 39226, 39227.

Fl. & Fr. Cold Season.

Distribution :—Western Himalaya from Kashmir to Garhwal, Western Tibet.

The erect habit and very large heads (balls) and involucrel distinguish it easily from *E. echinatus* DC.

Emilia javanica (Burm. f.) C.B. Robinson in Philip. Journ. Sci. 3:217, 1908; *Emilia sagittata* DC. Prodr. 6:302, 1837; Oliver Fl. Trop. Afr. 3:405, 1877; *Hieracium javanicum* Burm. Fl. Ind. 174, pl. 57, f. 1, 1768; *Emilia flammea* Cass. in Dict. Sc. Nat. 14:406, atlas 3, pl. 5; Hk. f. in FBI. 3:336, 1881; Garabechan in Kew Bull. 1924:143, 1924; Raizada in Journ. Ind. Bot. Soc. 15:155, 1936.

An erect glabrous or scabrid herb; lower leaves petioled, obovate or subspathulate, entire or toothed, upper large, oblong or ovate-oblong, deeply sagittately auricled, involucrel bracts much shorter than the scarlet flowers; achenes 5-ribbed, scabrid, style arms half-cylindric, tip conical.

Moradabad, T. Thomson 840, Fide Garabechan loc. cit.

Distribution :—Concan (indigenous?), Kodaikanal, Khasi; China, Japan, Siam, Philippine, Trop. Africa.

The above record of Moradabad, I strongly suspect refers to cultivated specimens as this species is commonly cultivated within the area.

Although Garabechan loc. cit. treats *E. javanica* and *E. sagittata* as two distinct and separate species, I personally feel, after examination of specimens of these two species, that they are hardly specifically distinct and hence I treat these as one polymorphous species.

Enaydra fluctuans Lour. Fl. Coch. 511, 1790; Hk. f. in FBI. 3:304, 1881.

A strigose hirsute marshy annual; stem 18-30 cm, elongate, rooting at nodes. Leaves opposite, sessile, linear or oblong-lanceolate, subentire, narrowed at both ends. Heads small, axillary or terminal, sessile, unilateral or in alternate axils, heterogamous, subradiate.

Rishikesh, Dehra Dun Dist. *M.A. Rau* 3892; *H.B. Naithani*; Mothronwala, *Raizada*; Jwalapur, near Hardwar, *Raizada*; Ballupur, Dehra Dun, *H.B. Naithani* 7471.

Fl. & Fr. Practically throughout the year.

Distribution :—Eastern Bengal, Bihar, Assam and lower Burma, Sumatra, Malaya, China.

The correct spelling is *Enydra* Lour. (Fl. Cochinch. 511, 1790) and not *Enhydra* as spelled by Hook. f. in FBI. 3:304, 1881, or in Flora of Tropical Africa, Flora of Trop. Africa ed. 1. and other works.

Erigeron bonariensis Linn. Sp. Pl. 863, 1753; Burt in Kew Bull. 1948: 371, 1948; Hara in Fl. E. Himalaya 136, 1971. *E. linifolius* Willd. Sp. Pl. 3:1955, 1804; Hk. f. in FBI. 3:254, 1881; *Raizada* in Journ. Ind. Bot. Soc. 15:155, 1936; *Conyza ambigua* DC. Fl. Franc. 6:Suppl. 468, 1815; *Erigeron ambiguus* (DC.) Sch.-Bip. in Berth. and Webb, Phyt. Canar. Sect. 2, 3:208, 1844.

An erect, annual-biennial herb. Stems ribbed, branched upwards, clothed with short appressed hairs mixed with long white hairs. Leaves linear-lanceolate or oblanceolate-spathulate, with a narrowed base, subacute, entire or serrate-incised, 2-5 (-6) \times 0.15—0.5 cm. Heads on 1-1.5 cm long peduncles; involucre bracts 3-seriate, linear, pilose, 0.2-0.45 cm long; corolla of marginal flowers filiform, 0.3 cm long, of disk-flowers 0.3-0.32 cm long; achenes thinly hairy, 0.15-0.16; cm long; pappus hairs dirty white, 0.3-0.32 cm.

Robber's Cave, Dehra Dun, *C.R. Babu* 32066; New Forest Dehra Dun, *H.B. Naithani* 3542; Puch kund, Ajmer, *V. S. Sharma* 621.

Fl. & Fr. Dec.-July.

Distribution :—Common in waste-places, road-sides, fields, tea-plantations, gardens and orchards; native of S. America, now naturalized in various parts of India.

Erigeron floribundus (H.B.K.) Sch.-Bip. in Bull. Soc. Bot. France 12:81, 1865 et in Linnaea 34:534, 1865-1866; Burt in Kew Bull. 1948: 372, 1948; *Erigeron linifolius* auct non Willd.; *Conyza floribunda* H.B.K. Nov. Gen. and Sp. 4:73, 1820; *Erigeron sumatrensis* Reiz. Obs. Bot. 5:28, 1789; Backer & Bahk. f. Fl. Java. 2:385, 1965.

Erect annual herb. Stems ribbed, simple below, corymbose-ly branched at the top, patentlly long hairy. Leaves linear-lanceolate or oblanceolate-spathulate, serrate-dentate in the upper part of lower ones, uppermost entire, glabrescent or thinly hairy, tapering to the base, acute, up to 10×2 cm. Heads in a pyramidal, leafy panicle, short-peduncled; involucral bracts 2-3 seriate, linear-lanceolate, pubescent, 0.3-0.55 cm; corolla of marginal flowers filiform, 0.4 cm long, of disk flowers yellow, 0.4 cm long; achenes thinly shortly hairy or glabrescent; pappus-hairs dirty white.

Bindal, Dehra Dun, C.R. Babu 34914.

Fl. & Fr. May-Nov.

Distribution :—Common in waste places, road-sides, gardens and agricultural fields; probably a native of S. America, now naturalized in tropics.

Very closely allied to *E. bonariensis* Linn. and in fact, mixed with it in the herbaria of Cal. DD and BSD, but is easily recognizable by smaller heads which are less than 1 cm across, pyramidal compound inflorescence, chestnut-brown coloured inner sides of involucral bracts of old heads and strawcoloured pappus.

Although, *E. sumatrensis* Retz., is the oldest binomial for this taxon, Burt (loc. cit.) adopted *E. floribundus* (H.B.K.) Sch.-Bip., which is based on *Conyza floridunda* H.B.K., the next earlier name, with the view that the identity of the former is uncertain as there is no type specimen, and since the insufficient description of Retzius does not justify that it actually belongs to *E. floribundus*. I am, therefore, following Burt in adopting *E. floribundus* as the correct name for this taxon.

Erigeron karvinskianus DC. Prodr. 5:85, 1836. (= *kurvinskianum*); Blake in Contr. Gray Herb. N.S. 52:30, 1917; Backer & Bahk. f. Fl. Java 2:385, 1965; Bahadur et al in Journ. Bom. Nat. Hist. Soc. 70(3) 494, 1973; *E. mucronatus* DC. Prodr. 5:285, 1836; Som Deva in Bull. Bot. Surv. Ind. 10(2):180, 1968; Raizada in Ind. For. 85 (11):679, 1959; *E. trilobum* Sonder in Himburger, Gart.-Blum.-Zeit. 12:78, 1856. excl. Syn.

A prostrate ascending, multicauline, perennial herb with a somewhat woody base. Stems often much branched, purpletinged, often rooting at the base, glabrous except hairy young parts. Leaves sub-sessile or short-petioled, obovate elliptic, upper ones linear-lanceolate, tapering to the base, acute, 3-lobed in the upper part, glabrous or thinly appressed-hairy, $0.5-4 \times 0.8-2$ cm. Heads axillary and terminal, solitary, on a leafless or only basally leafy 1-15 cm long peduncle; involucral bracts 3-4 seriate, linear-lanceolate, acuminate, hairy, 0.15-0.4 cm long;

corolla of marginal flowers white or tinged with white, 2-toothed, 0.5-0.6 cm, of disk-flowers yellow, 0.3 cm long; achenes thinly hairy, 0.12-0.13 cm; pappus-hairs whitish, 0.3 cm long.

Robber's Cave, Dehra Dun *Raizada*; *Som Deva* 1559, 2030; *C.R. Babu* 32086; New Forest, Dehra Dun, *H.B. Naithani* 6555 & 6556.

Fl. Throughout the year.

Distribution :—Native of Central America. Naturalized in rocks along river banks and old earth and brick-walls.

Blake (loc. cit.) was the first to unite *E. mucronatus* DC. and *E. karvinskianus* DC., and adopted the latter name for the combined taxon. Hence, the correct name for this plant according to Art. 57 of ICBN (1972) should be *E. karvinskianus* DC.

Erigeron multicaulis Wall. ex DC. Prodr. 5:292, 1836; *Raizada & Saxena Fl. Mussoorie* 751, 1976. *Erigeron alpinus* L. var. *multicaulis* Hk. f. *FBI*. 3:255, 1881.

A herb, 10-60 cm high often tufted, more or less glabrous. Radical leaves petiolate, spreading, oblong entire or toothed. Cauline-leaves sessile, lanceolate or oblanceolate, 2.5-6 cm long, entire or coarsely toothed. Heads radiate, 1.5-1.7 cm across, long-stalked, in terminal corymbose panicles. Ray-florets pinkish, longer than the pappus. Disk florets yellow, 5-6 mm long. Pappus hairs white or often tinged with red.

New Forest, Dehra Dun *Raizada*; Ranger College, Old Hostel, New Forest, Dehra Dun, *H.B. Naithani* 6922 & 6923.

Fl. & Fr. April-Oct.

Distribution :—Himalaya 900-3000 m. Common in Mussoorie, *Saxena* 445, 6990, 1263, 2265; Camelsback Road, Mussoorie *Raizada*.

Eupatorium adenophorum Sprengel, Syst. Veget. 3:420, 1826; *Koster in Blumea* 1:502, 1935; *Robinson in Contr. Gray Herb. n. s.* 60:85, 1919 (in obs.); *Hara in Fl. E. Himal.* 137, 1971; *Raizada & Saxena in Journ. Bom. Nat. Hist. Soc.* 64(1):83, 1967; *Eupatorium glandulosum* H. B. & K. Nov. Gen. et. Sp. 4:122, 1820 (non Michx. 1803); *Raizada in Ind. For. Rec. (n.s.) Botany* 4 (3):66, 1950.

A stragling, perennial branched undershrub. Branches cylindrical, reddish, densely glandular hairy. Leaves opposite, petioled, rhomboid-ovate, trapezoid or almost angular; sharply pointed, coarsely serrate above the cuneate base, 2.5-9 cm long, nearly glabrous above, hispidulous along the nerves and glabrate beneath, obscurely glandular on the petiole which is 2.5-5 cm long and on lower surface. Corymbs fastigate-trichotomous; flowerheads clustered, white, pedicelled, 40-70 flowered,

slightly fragrant; receptacle flat; involucre bracts about twenty in two rows, lanceolate, acuminate, striate, glandular-ciliate, mostly subequal shorter than the florets, with scarious margins and with two well-defined nerves. Corolla-tube white, 1 mm, slender, abruptly dilated. Style-arms long and far exerted, divergent. Achenes black, glabrous, slender, crowned by a pappus of 10-12 white scabrid hairs, twice as long.

Chir plantation, New Forest, Dehra Dun *Raizada*; H.B. Naithani 6590; Robber's Cave, C. R. Babu 35049.

Fl. & Fr. March-July.

Distribution:—A native of Mexico and Jamaica.

It was introduced as a garden plant about 1924 but within recent years it has run wild and naturalized. It is fairly common along streams below Bhatta-Dhobighat (Mussoorie). Also at Jharipani, etc.

Eupatorium odoratum Linn. Syst. Nat. ed. 10, 1205, 1759; Clarke Comp. Ind. 30, 1876; Hk. f. in FBI. 3 : 244, 1881; Koster in Blumea 4 : 492, 1941; Robinson in Contr. Gray Herb. n.s. 55 : 241, 1918. *Eupatorium conyzoides* Mill. Dict. ed. 8 No. 14, 1768. *E. conyzoides* Vahl, Symb. Bot. 3 : 961, 1794.

A coarse herb; stems terete, striate, softly hairy to glabrescent. Leaves upto 6×3 cm, ovate to ovate-rhomboid, clothed with slender soft hairs above, densely so and glandular beneath, coarsely dentate or dentate-serrate along margins, acuminate at apex, cuneate at base; petioles up to 1.5 cm long, densely hairy. Heads homogamous, with all flowers tubular, corymbose; involucre bracts numerous, many-seriate, outer shorter; cypselas 5-angled, minutely scabribulous along angles. Pappus of numerous hairs, 1-seriate, scabribulous, white.

Bindal, Dehra Dun, C. R. Babu 35437; Dehra Dun *Raizada* s.n.

Fl. & Fr. Sept.-Nov.

Distribution:—Native of West Indies and America, probably introduced from Jamaica to India and Burma by seeds in the ballast of cargo boats anchoring at Singapore, after Roxburgh's time. (Biswas Ind. For. 60: 861-65, 1934). From there the plant found its way to lower Burma, gradually encroaching further inland, now wild everywhere ascending up to 2,430 m in Eastern Himalayas, Eastern and Southern India, extending to Bihar and further Northwest towards the Upper Gangetic Plains. Also extends to Sikkim, Bhutan, E. Pakistan (Bangladesh) Malesia; Van Steenis (Reinwardtia 1 : 478-480, 1952) narrates its progressive spread in Malesia.

Robinson (loc. cit.) stated *E. conyzoides* Mill. (1768) & *E. conyzoides* Vahl (1794) which were hitherto considered distinct species are conspecific with *E. odoratum* Linn., which is the correct binomial and hence the correct name of the plant.

Eupatorium riparium Regal, Gaerten Flora 15 : 324, t. 525, 1866; Koster in Blumea 1 : 503, 1935; Raizada & Saxena in Journ. Bom. Nat. Hist. Soc. 64(1) : 83, 1967; Naresh Bahadur et al in Journ. Bom. Nat. Hist. Soc. 70(3) : 495, 1973.

A perennial, with subterraneous stolons. Stems reddish-purple, decumbent-ascending or straggling upwards, often rooting at the base. short-hairy; leaves on 0.6-1.5 (2) cm long petioles, elliptic-lanceolate, with a narrowed base, acuminate, serrate-dentate above the entire base, 3-nerved, glabrous or so, 4-6 (-10) \times 0.5-3 cm. Heads 20-flowered, in lax panicle-form corymbs, 0.4-0.5 cm across, short-peduncled; involucrel bracts 1-2 seriate, 0.12 cm, linear-lanceolate, subacute, 2-nerved, hairy, 0.3-0.5 cm long; corolla white, 0.3-0.35 cm, lobes gland-hairy; achenes black, hairy on the ribs, 0.25 cm; pappus whitish, 0.3 cm long.

Robber's Cave, Dehra Dun, Raizada, s.n., C.R. Babu 33843; New Forest, Dehra Dun, R. Dayal 21759; H.B. Naithani 1928.

Fl. & Fr. Feb.-May.

Naturalized in water-sides, ravine-slopes, road sides and humid shady places; native to Mexico and West Indies.

Duthie (loc. cit.) recorded *E. asteroides* Roxb., from Dehra Dun, but the author has not seen any specimen from this area.

Flaveria australasica Hook. in Mitch. Journ. Trop. Austral. 118; Benth. Fl. Austral. 3 : 546, 1866; Gamble Fl. Madras 2 : 501, 1957 (Rep. ed.); M.A. Rau & T.A. Rao in Bull. Bot. Surv. Ind. 2(3 & 4) : 425, 1960.

An erect, glabrous often 2-chotomously branched herb up to 50 cm with opposite or pseudo-vert cillate linear-lanceolate, lanceolate or oblanceolate leaves. Leaves 3-nerved, 2.5-5 cm long, tapering into a slender petiole which is again dilated at the amplexicaule base or those subtending the heads sessile with dilated base. Compound heads up to 1.4 mm across, globosely fasciculate, involucrel, axillary, subtended by a leaf and several bracts equalling or exceeding the heads. Individual heads small, 1-5-flowered (both female and hermaphrodite), homogamous or with very shortly ligulate female. Receptacle naked. Style of hermaphrodite flower with truncate arms. Achenes flat, ribbed; pappus O.

Lalitpur, Jhansi Distr., T. A. Rao 8398.

Fl. March.

Distribution.—A native of Australia, now introduced into India and is rapidly spreading. Already collected from South India and Madhya Pradesh.

I am unable to distinguish this species with the closely allied *Flaveria repanda* Lag. [= *F. trinervia* (Spr.) C. Mohr.] which is also reported from our area.

Flaveria trinervia (Spr.) C. Mohr. Contr. U.S. Nat. Herb. 6:810, 1901; Rydberg N. Amer. Fl. 34:2, 143, 1915; Raizada & Sharma in Ind. For. 88(5):363, 1962; *Oedera trinervia* Spreng. Bot. Bart. Halle 63, 1800; *Flaveria repanda* Lag. Gen. & Sp. Nov. 33, 1816; Haines, Bot. Bih. & Oris. 486, 1922.

A dichotomously branched glabrous annual, 1.5-7.5 cm high. Branches opposite usually from all axils divaricate and more frequently over-topping the main branches, somewhat sulcate when dry. Leaves opposite, $2-10 \times 1-3$ cm, generally elliptic-lanceolate or broadly elliptic, occasionally oblanceolate; petiole 1-3 cm long, dilated and half amplexicaule at base, the leaves subtending the bracts pseudo-vericillate and sessile, with their bases much dilated; apex acute, margins coarsely serrate or almost entire in case of upper small leaves; veins 3, prominent beneath and nearly parallel, the outer two running much away from the margins. Heads yellow, compound, fasciculate into a terminal subglobose glomerule of 0.5-3 cm diameter, sessile in the forks or later becoming shortly stalked; the sub-heads at the base of pseudo-vericillate leaves of a glomerule sessile as inner ones or sub-sessile. Occasionally a short branchlet with a secondary terminal glomerule is also subtended by the pseudo-vericillate leaves. Florets in a head, hermaphrodite as well as ligulate female, all fertile, mostly solitary with two connivent involucrel yellowish bracts or in clusters of 2-5 flowers all hermaphrodite or mixed with a ligulate, and surrounded by 2-5 or more involucrel bracts as well as 2-4 or more peleeaceous receptacular bracts which are shorter or hardly equalling the involucrel. Corolla of female floret tubular, the tube short somewhat conical with a very oblique mouth, the lip minute or reduced to zero, outside near the dilated base glandular-hairy; of hermaphrodite florets—the corolla tube much larger than the ligulate, glandular-hairy outside near the base, 5-lobed, the lobes deflexed; anthers with apical appendages obtuse, anther-cells at base obtuse, filaments short, apparently jointed above the middle. Style-arms truncate in hermaphrodite florets. Cypsella 2.5 mm long, somewhat compressed, 10-12-ribbed, dark-brown, oblong, narrowed to

wards base, enclosed by the persistent folded involucre bracts.
Pappus 0.

D.A.V. College, Agricultural Farm, Ajmer, V.S. Sharma
211; Foysagar Road, Ajmer District V.S. Sharma 814; Keki
V.S. Sharma 1388.

Fl. & Fr. Almost throughout the year.

Distribution :—A native of Central America but now naturalized in many parts of the country as a weed of moist situations particularly around cultivation near wells and along water channels.

According to Haines (loc. cit.) this species resembles closely *Flaveria australasica* Hook. (which is a native of Australia), but it has somewhat larger leaves and its cypselas are longer with stronger ridges but the plant would appear to be little more than a variety. In my opinion both these species are probably the same as suggested by Haines.

Galinsoga ciliata (Raf.) Blake in *Rhodora* 24:35, 1922; Butcher, Ill. Brit. Fl. 2:428, 1961; Salisbury, *Weeds & Aliens* 57, f. 7, 1961; Kitamura in Fl. East Himal. 339, 1966; Babu in Bull. Bot. Surv. Ind. 11:184, 1969. *Adventina ciliata* Raf. New. Fl. N. Amer. 1: 67 1836; *Galinsoga parviflora* Cav. var. *hispida* DC. Prodr. 5:677, 1836 (non *G. hispida* Benth. 1844); *G. aristulata* Bick in Bull. Torrey Bot. Club 43:270, 1916.

An erect, somewhat flaccid, simple or sparingly branched annual herb 15-75 cm tall; stems widely branched in the upper part, often decumbent below, glabrescent downwards, gland hairy patent-short-hairy upwards; leaves ovate or elliptic-oblong with a cuneate base, acute or rather acuminate, thinly hairy, 2-6 (-8) × 0.5-4 cm; petiole 0.5-5 cm long. Heads 0.5-1 cm across, terminal and axillary, combined into a terminal, leafy, corymbiform panicle, peduncle 0.5-2 cm long, gland-hairy, involucre bracts 2-seriate, 6-8, ovate, obtuse, gland hairy, 0.35-0.45 cm long; marginal flowers 5, with white, 3-dentate, hairy, 0.5-0.55 cm long ligules; corolla of disk flowers yellow, hairy 0.3-0.35 cm long; achenes black, hairy, turbinate, 0.13-0.17 cm long; pappus scales 16-20, ciliate, 0.1-0.15 cm long; pales 0.20-0.3 cm long, fimbriate, acute.

Tapkeshwar, Dehra Dun, *Raizada*; Bindal, Dehra Dun C.R. Babu 4926; Rispana C.R. Babu 32290; New Forest, Dehra Dun, H.B. Naithani 3152.

Naturalized in waste places, gardens and fields; native of tropical America.

Previously confused and mixed with *G. parviflora* Cav., also a native of Tropical America, now a pantropical weed; but is easily recognizable according to Blake, loc. cit. by awn tipped pappus-scales, longer ligules of marginal flowers, entire pales and densely glandular-hairy stems and peduncles.

Although I have included it on the authority of Blake, I am very doubtful if it is really distinct from *G. parviflora* Cav., which is also a native of tropical America and introduced into this country long ago, as specimens with intermediate characters of the two species occur in nature. At the most it can be regarded only as a variety.

Gerbera gossypina (Royle) Beauv. in Bull. Soc. Bot. Gen. 2:240, 1910; B.L. Robinson in Proc. Am. Acad. Ser. 49:515, 1913; Kitamura Pl. West Pakist. & Afgh. 149, 1964; *Chaptalia gossypina* Royle III 251, t. 59, f. 2, 1835; *Gerbera lanuginosa* (Wall. ex DC.) Sch. Bip. in Flora 27:780, 1844; Hk. f. in FBI 3:390, 1881; Som Deva in Bull. Bot. Surv. Ind. 14(2): 180, 1968. *Oreoseris lanuginosa* Wall. ex DC. Prodr. 7:17, 1838.

An acaulescent herb. Leaves all radical, petiolate or sessile, lanceolate or oblanceolate, 5-15 × 1.5-7.5 cm, often lyrate-pinnatifid or lobed, thickly felted on the lower surface. Heads radiate, 3-5 cm across, solitary on long scapes; white-tomentose, 10-30 cm long, naked or with small scattered bracts. Involucre bracts many-seriate, unequal, white woolly outside. Florets white or tinged with pink. Pappus hairs white.

Shoepur Rau; Dehra Dun Siwaliks, **Raizada**; Sahasradhara, *Som Deva* 2060, in the grassy side of nala.

Fl. & Fr. Feb.-July.

Distribution:—W. Himalaya 1200-2400 m, also in Siwaliks.

Raizada and Saxena (Ind. For. 92(5): 311, 1966) being unaware of the earlier combination, *G. gossypina* (Royle) Beauv., made a fresh combination, which is nomenclaturally superfluous, and hence should be rejected according to Art. 63 of ICBN (1972).

Gnaphalium peregrinum Fernald in Rhodora 45, 1943; Munz & Heck, Cal. Fl. 1259, 1959; Backer and Bakh. f., Fl. Java 2: 394, 1965; N. C. Nair Journ. Bom. Nat. Hist. Soc. 63(3): 777-778, 1966. *Gnaphalium purpureum* auct. plur. non Linn.

Annual herb, often much branched from base; stem shortly white-appressed hairy; leaves spatulate, surface thinly arachoid or subglabrous, 1-9 cm by 5-22 mm, higher ones

smaller. Involucral bracts thin, flaccid, gradually narrowed upwards, glabrous, at base densely floccose, white-woolly, upper and middle bracts of speciform inflorescence not are hardly longer than the breadth of the inflorescence; clusters consisting of 2-5 heads, sessile; heads campanulate, 4 mm long; involucre also 3.5 mm long; bracts oblong-elliptic, light brown finally spreading with decurved bases; marginal flowers about 3 mm long; disk flowers 3-4, also 3 mm long; corolla-segments often red; echinulate, 0.5 mm long; pappus hairs about 2.5 mm.

Dehra Dun Duthie 1782; Gamble 24631; Agra, Jameson (Feb 1842); Mohrina, Kheri Dist. Inayat 22259 a-b; New Forest Dehra Dun Raizada; H. B. Naithani 1521 & 7478; Rispana, Dehra Dun, C.R. Babu 34628; Etawah, C.L. Malhotra 13537. Cloud End. Mussoorie H.O. Saxena 1473; Near Birk Niwas, Mussoorie H.O. Saxena 1391.

Native of America, now naturalized in fields, waste places, road sides and way sides in India (Uttar Pradesh, Punjab, Orissa). Also reported from Java.

Fl. & Fr. Dec.-May.

This species is very similar to *G. purpureum* L., but can be distinguished:

Lower leaf surface closely white-pannose, with the subpressed hairs lightly; involucre densely woolly at base only; heads 4-6 mm long. *G. purpureum*.

Leaf's lower surface loosely villose-lanate; involucre almost completely covered in wool except the tip, heads 3-4 mm long. *G. peregrinum*.

This species is closely allied, and indeed mixed with *G. purpureum* Linn., also a native of America, now naturalized in tropics, in Indian Herbaria, as well as in the floras, but can be easily distinguished by smaller heads, less woolliness of stems and leaves and densely floccose, white-woolly bases of involucral bracts which gradually narrow upwards, whereas *G. purpureum* Linn., is characterised by larger heads 0.4-0.6 cm long, densely white-woolly stem and leaves and glabrous abruptly acuminate involucral bracts.

This is the first report of its occurrence from Upper Gangetic Plain. *G. purpureum* Linn. has not been collected from this area but the possibility of its occurrence in other parts of the country is not ruled out, as both species have been recorded for Java (vide Backer & Bakh. f., Fl. Java 2:394, 1965).

Hymenatherum tenuifolium Cass. Dict. Sc. Nat. 22:314. 1821-1822; DC. Prodr. 5:642, 1834.

A strong-smelling, erect, annual herb, 15-20 cm high. Stems simple or branched. Leaves deeply pinnatisect, 2.5 × 1.3 cm; lobes more or less filiform. Heads yellow, heterogamous, rayed, about 2 cm across, terminal, showy. Involucres uniseriate. Achenes oblong, angled, black, hispid-hairy; pappus of setose hairs about as long as the corolla tube.

Grown as a winter ornamental annual and as border plant in garden beds, but often spontaneous in waste places near gardens and bungalows in Delhi and other places.

Fl. & Fr. Oct.-April.

Distribution:—Native of Central America.

Inula cuspidata (DC.) Clarke, *Comp. Ind.* 125, 1876; Hk. f. in *FBI* 3:296, 1881; Som Deva in *Bull. Bot. Surv. Ind.* 10(2): 180, 1968; *Amphiraphis cuspidata* DC. *Prodr.* 5:343, 1836.

Erect, perennial undershrubs or shrubs. Stems glabrous except hairy young parts. Leaves on 0.5-1.5 (-2) cm long petioles, elliptic-lanceolate-oblong, slightly oblique in the lower part, with a narrowed base, acute or acuminate, serrate-dentate, glabrous except hispidulous nerves beneath, 5-15 × 2-5 cm. Heads in terminal, corymbiform panicles, 1.3-1.5 cm long; involucral bracts 2-3-seriate, linear, hairy, acuminate, 0.15-1.5 cm long. Corolla of marginal flowers 0.8-1 cm long, 3-dentate, of disk-flowers 0.6 cm long; achenes thinly hairy, 0.2-0.21 cm long; pappus-hairs pale yellow, clavate at the top, 0.5 cm long.

Sahasradhara, *Raizada*; Som Deva 1440; C. R. Babu 34690; Robber's Cave, C.R. Babu 34690 (a); Chakrata Road, Dehra Dun, Ram Dayal 886.

Fl. & Fr. Sept.-Dec.

Distribution:—Hitherto recorded between 1320-3300 m, in the Western Himalayas.

Inula eupatoroides DC. *Prodr.* 5:469, 1836; Hk. f. in *FBI* 3:295, 1881; Som Deva in *Bull. Bot. Surv. Ind.* 10(2):180, 1968.

Shrubby; branches stout and leaves beneath and corymbs pubescent or sub-tomentose; leaves shortly petioled, elliptic-oblong or lanceolate acuminate, coriaceous, irregularly toothed, scabulous above. Heads numerous about 0.8 cm across, in terminal corymbs, shortly peduncled; involucral bracts subulate, tomentose. Achenes silky.

Near Rajpur, *Raizada*; Som Deva 1528, in dry river bed.

Distribution:—Eastern Himalaya in Sikkim, Khasi hills, Burma,

Inula nervosa Wall. ex DC., Prodr. 5:471, 1836; Hk. f. in FBI. 3:293; 1881; Malhotra in Maharashtra Vidhyan Mandir, Patrika 6(1):41, 1971.

A herb 30-90 cm high, pubescent or *hirsute*. Leaves alternate, sessile, subsessile or shortly petiolate, elliptic-lanceolate, distantly subdentate, pubescent, scaberulous or scabrid above. Heads radiate, 2.3 cm across, solitary or corymbose, peduncled. Ligules white; disk-florets yellow.

Sahasradhara, on rocky slopes, S.K. Malhotra 34842.

Fl. & Fr. Aug.-Nov.

Distribution:—Temperate Himalaya, 1200-2100 m from Garhwal to Bhutan; Khasi Mts.

This species is common in Mussoorie along waysides and often in forests, 15-2100 m: Way to Murray's Spring Forest, Arnigarh, Barlowganj, Cloud End etc. It is extremely doubtful if it descends to the base of Sahasradhara and must have been collected from an elevation higher than 1100 m. I have never collected or come across this plant in the vicinity of Sahasradhara.

Ixeris sagittarioides (Clarke) Stebbins in Journ. Bot. 75: 50, 1937 et in Ind. For. Rec. 1:237-45, 1939; Babu in Bull. Bot. Surv. Ind. 8(2):200, 1966; Kitamura in Fl. E. Nepa 140, 1969; Hara in Fl. E. Himal 138, 1971; *Lactuca sagittarioides* Clarke Comp. Ind. 265, 1876; Hk. f. in FBI. 3:410, 1881.

A glabrous herb, leaves all radical, long-petioled, sagittate acute or obtuse, entire or denticulate; petiole 13-25 cm long with a coriaceous entire wing that narrows downwards. Flowering stems 15-44 cm, slender, sometimes sparsely hairy above, bracts at the forks minute. Heads erect, outer involucre bracts very small, inner 6-10, linear-oblong; ligules yellow. Achenes about 1 mm including the beak, which is much shorter than the body.

Rispana, Dehra Dun, C. R. Babu 35207; common in shady localities in Sal-forest.

Fl. & Fr. March-May.

Distribution:—Western and Central Himalaya, from Dharamsala to Bhutan, between 1650-1980 m; North Burma.

Jurinea ceratocarpa (Decne) Benth. in Gen. Plant. 2:474, 1873; var. *depressa* Clarke ex Hk. f. in FBI. 3:378, 1881; *Saussurea ceratocarpa* Decne in Jacquem. Voy. Bot. 93, t. 101, 1844; Panigrahi & Saran in Bull. Bot. Surv. Ind. (1-4):255, 1968.

This species, as far as my information goes, and from my personal experience of exploration in N.W. Himalayas usually occurs above 27,00 m as in Spiti, Lahul, Ladakh, Bashahr (Himachal Pradesh) from which localities I have myself collected it (var. *depressa* Clarke ex Hk. f. in FBI. 3: 378, 1881). The typical variety is found in Kashmir from 2400-3600 m.

Almost certainly, therefore, the locality (Gorakhpur) as given by Panigrahi & Saran is wrongly localized for it is unbelievable that a species which normally occurs at such great heights could descend and be found in the plains of Gorakhpur in Uttar Pradesh. Possibly the specimen in question was collected by Dr. E. Janaki Amal, who, for quite sometime, was working in Kashmir and later joined the Central Botanical Laboratories, Allahabad as Officer on Special duty as Director, Bot. Surv. India and her collections from Kashmir apparently got mixed up with Panigrahi's collection from Gorakhpur.

On way to Daibhar, Gorakhpur dist. *Panigarni* 10730 (Feb. 1966) in moist grass near the edge of taungya cultivation,

Distribution :—Kashmir, Western Tibet from 2700-4500 m.

Lagasca mollis Cav. in Anal. Cienc. Nat. 6:332, t. 44, 1803; DC. Prodr. 5:91, 1836; Hk. f. in FBI. 3:302, 1881 (under *Lagascea*); Raizada & Sharma in Ind. For. 88(5): 362, 1962.

A rigid annual. Stem and branches scabrid; leaves opposite or the upper alternate, petioled, ovate, acuminate, subcrenate, silky tomentose beneath. Heads in leafy balls, solitary terminating in slender naked peduncles; flowers white. Invol.-tubular of 5 connate bracts; anther bases sagittate, auricles obtuse. Style arms elongate, acute, hairy. Achenes cuneate, compressed or 3-angled, tip rounded. Pappus very obscure.

A weed in cultivated places. Foyasagar, Ajmer District V.S. Sharma 744.

Fl. & Fr. Throughout the year.

Distribution:—Indigenous in Central America, now run wild in several parts of the country.

Laggera pterodonta (DC.) Sch.-Bip. ex Oliv. in Trans. Linn. Soc. 29:94, 1873; Hk. f. in FBI. 3:271, 1881; Som Deva in Bull. Bot. Surv. Ind. 10(2): 180, 1968; *Blumea pterodonta* DC. in Wight Contrb. 16, 1834.

An aromatic erect herb. Stem much branched, glabrous, with deeply toothed lobed or interrupted wings. Leaves sessile, oblanceolate, toothed or pinnatifid at the base. Heads about 2 cm across on slender peduncles on the ends of branches; flowers

Aligarh hedges & montane. Involucral bracts glabrous, rigid. Pappus of white
Rajpur, Saxena 185, 1733; Som Deva 498, on stones
d.

Fr. Jan.-April.

gal, K. & Fr. Jan.-April.
East India. Distribution:—Tropical Himalaya from Simla eastwards,
Americas. Igiri & Pulney hills, Burma, Trop. Africa.

Laurea fallax (Jaub. and Spach) O.K. Rev. Gen. Pl. 1:
into difficult; Rech. f. Symb. Afgh. 2: 199, 1955; Kitamura Fl.
are referred; 1960; *Microrhynchus fallax* Jaub. and Spach, Ill.
from *Laurea* 106, 276, 1875; *Laurea nudicaulis* Hook.f. in Fl.
cence, s. 3: 416, 1881 (non *Microrhynchus nudicaulis* (Linn.)
numerous

this species. Annual herb, multicauline, with yellow juice. Root
Koster. and woody. Stems simple or sparingly branched,

Res. a basal rosette, oblong-oblancoate or spatulate,
the species. Howed base, obtuse, repand, dentate to pinnately lobed
rantha Hb. 1, somewhat glaucous beneath, 5-20 cm long; lobes
Americas. serrulate with cartilage-pointed teeth. Heads yellow,
cordata O.K. on 0.5-1 cm long bracteate peduncles, solitary or in
eastern India. combined into a terminal subracemose inflorescence;
experts at. bracts 3 seriate, outer ovate, 0.2-0.3 cm, inner ones
University. 0.5-1 cm long; ligules yellow, marginal ones with
in to tota. bracts; achenes rugolose, pitted, 0.35-0.4 cm long; pap-
and find. with a pappiferous disk, 0.8 cm long.
however,

The plant, Dehra Dun, C.R. Babu 32026.

West India. on in grassy sandy localities, road sides, gardens,
fields, forest-edges, forest-clearings and scrub-jungles.

Infested. Fr. Mar.-Nov.
cies of *M. nudicaulis* (Linn.) Less with which it was formerly
uptil now. species is now considered to be distinct from
predominate. *Laurea nudicaulis* (Linn.) Less with which it was formerly
presumably. because of

Laurea resedifolia (Linn.) Druce in Report Bot. Exch.
Bot. 2: 162. 1913, 3:420, 1914; *Scorzonera resedifolia* Linn.
, 1753; *Laurea chondrioloides* (DC.) Hk. f. in
1881; Raizada & Sharma in Ind. For. 88(5):363,
Erect. *Scorzonera chondrioloides* DC. Prodr. 7:183, 1838.

cellate on. Annual glaucous herb with little milky sap, 3-8 dm
lobed, pinnate. Dichotomously branched, terete, sulcate, woody at
lar and hairy. leaves sub-rosulate, 4-15 x 5-2 cm, lanceolate or
minate, to. subentire;
subentire; spatifid, spinulose-toothed, attenuate at base; cauline
into a hairy

sessile, half-amplexicaule, narrower and pinnatifid, those at forks of peduncles ovate or deltoid, entire, apparently bract-like. Heads 1-2 cm long on subdivaricate, bracteate peduncles. Involbracts 3-4 seriate with 3-4 bracts in each series, outermost much smaller and deltoid or ovate; inner up to 2 cm long, oblong-lanceolate, sub-acute or with somewhat rounded ciliolate tips, margins hyaline and entire; ligules of marginal florets on outer surface greyish and with two parallel purple veins. Pappus white, longer than achenes, inner few visibly longer and rigid than the numerous soft outer hairs. Achenes 6-7 mm long, narrowly cylindric, slightly contracted below the apical truncate end, at base obscurely 3-4-toothed, strongly ribbed, the ribs scabrous, receptacle naked.

Pushkar, Ajmer District, V.S. Sharma 740; Pushkar-Talora Road, V.S. Sharma 1457.

Fl. & Fr. Throughout the year, particularly during hot weather.

Distribution:—Punjab, Multan, Hills of Rawalpindi, Sindh, Afghanistan, Persia, Arabia, Egypt.

Mikania cordata (Burm.f.) Robinson in Contrib. Gray Herb. n.s. 104: 65, 1934; Koster in Blumea 1: 504, 1935; *Eupatorium cordatum* Burm. f. Fl. Ind. 176, t. 58, f. 2, 1768; *Mikania scandens* (auct. non Willd., 1803); Clarke Comp. Ind. 34, 1876; Hk.f., FBI.3: 244, 1881.

Twining herb. Stem angular, striate, twisted, puberulous. Leaves 2.9-7 cm long, 2-4 cm broad, ovate, opposite, crenate along margins, glabrous, acute or acuminate at apex, cordate, hastate or rarely truncate at base; petioles 1-5.5 cm long. Heads 3.5-6 mm long, 2.2-0.5 mm across, 4-flowered, homogamous, in paniculate corymbose culsters, terminating lateral branches; branchlets angled; peduncles absent or up to 2-4 mm long, slender; involucre oblong-tubular, bracts 4, 1-seriate, each 3.5-4 mm long about 1 mm broad, outer ones often about 2.5 mm long, narrowly oblong-obovate; glabrous, acuminate at apex; receptacle small, flat, naked. Flowers all tubular, hermaphrodite, regular, white, fertile; corolla about 3 mm long, regular; tube slender; limb campanulate, 5-lobed; lobes acute, sparsely hairy without. Anthers appendiculate at apex, obtuse at base. Style thick, glabrous; style-arms about 2.5 mm long, flattened, minutely papillate, acute at apex. Cypsela about 1.5 mm long, linear-oblong, 4-5-angled, minutely glandular, black or blackish-brown, truncate at apex. Pappus 2.75-3 mm long, numerous, 1-seriate, scaberulous, white, sometime pale purplish in fruit, connate at base in a ring.

Jalali, Aligarh Distr. Husain 548; Machua and Morthal

Aligarh Dist. Husain 502, 629. Common in waste places, on hedges and bushes in shady situations and twining on *Diospyros montana* and *Cordia dichotoma*.

Fl. & Fr. Nov.-Feb.

Distribution:—Tripura, Bhutan, Eastern Assam and Bengal, Kerala, Sikkim, Burma, Malaya Peninsula, Indo-China, East Indies, Siam, Formosa, Philippines, Central & North America.

Loose aggregate of *Mikania scandens* has been segregated into different species by Robinson (l. c.). The Old World plants are referable to the present species by him, since they differ from *M. scandens* Willd. of N. America in their open inflorescence, slightly larger heads, more pointed involucre bracts and numerous pappus. Koster (l. c.) distinguishes four forms under this species and our plant comes nearest to forma *dentata* Koster.

Recently Vaid (Ind. For. 99(1): 19, 1973) has revealed that the species most common in the Indian region is *Mikania micrantha* H.B.K. (Nov. Gen. et Sp. 4: 130, 1820), a species of South American origin and well known in the West Indies and not *M. cordata* or *M. scandens* which are supposed to be prevalent in eastern India. He sent his specimens for confirmation to the experts at the Gray Herbarium, Arnold Arboretum of Harvard University, Cambridge, Mass., U.S.A. who confirmed his views in a letter saying "We have checked your specimen of *Mikania* and find that it does agree with *M. micrantha* H.B.K. We do not however, have herbarium material of that species from India. The plant is well known to us who have had experience in the West Indies".

Inferring from the above findings, it appears that the species of *Mikania* which is common in eastern India, Pakistan and upto now known by the name of *M. scandens* or *M. cordata* is predominantly, if not completely *M. micrantha* H.B.K., and presumably, it has all along been going under a wrong name because of misidentification.

Montanoa grandiflora (DC.) Hemsl. Biol. Centr. Amer. Bot. 2: 165, 1881.

Erect shrubs. Young branches hairy, glabrous and lenticellate on older ones. Leaves opposite, petioled, irregularly 3-7-lobed, pinnatipartite or 2-pinnate, serrate, hispid above, glandular and hairy on the nerves beneath, lobes ovate-lanceolate, acuminate, lower ones up to 40 cm long, upper ones smaller and subentire; petiole 3-15 cm long. Heads in corymbs, combined into a hairy panicle, on nodding hairy 3-15 cm long peduncles,

7-10 cm across; involucre bracts 2-seriate, ovate-lanceolate; marginal flowers 10, with white, entire, 3 cm long corollas; disk flowers with yellow corollas, 1 cm long; achenes obovoid; pappus wanting, pales obovate, ciliate.

Established in ravines; often cultivated in gardens as an ornamental; native of Mexico.

Bindal, Dehra Dun C.R. Babu 34670.

Fl. & Fr. Dec.-April.

This is the first report of its occurrence in a semi-naturalized state in India. It has however not yet been completely naturalized.

Myriactis wallichii Less in *Linnaea* 6: 129, 1831; Hk.f. in *FBI.* 3: 247, 1882; Collett, *Fl. Sim.* 249, 1921, *pro parte*; Backer & Bakh.f. *Fl. Java* 2: 283, 1965; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika, 5(1 & 2): 39, 1970.

A erect much branched annual herb, 15-90 cm high. Leaves alternate, petiolate, ovate or lanceolate, 2-11 × 0.8-5.5 cm, irregularly and coarsely or distantly toothed; petiole winged. Heads radiate, 6-10 mm across, paniculate on diverging stalks. Receptacles convex, naked. Ray florets white; disk florets yellow. Pappus none.

Khera Ghat, Saharanpur Siwaliks, Royle; Sahasradhara along the rocky slopes, S.K. Malhotra 33998.

Fl. & Fr. Aug.-Nov.

Distribution:—Temperate Himalaya, 1200-3000 m, Central Asia, Java, etc.

This species is extremely common in Mussoorie, 1600-2250 m. Its seeds may have got washed down and hence its occurrence on the slopes of Sahasradhara.

Parthenium hysterophorus Linn. *Sp. Pl.*, 988, 1753; Hill, *Veget. Syst.*, 3: t. 21, 1961; Descourtilz, *Fl. Pitt. & Med. Antilles* 6: t. 395, 1828; Hoffmann in Engler and Prantl., *Nat. Pfam.*, 4(5): 114, 1907; Arechavaleta, *Fl. Urug.*, 3: 300, t.59, 1908; Britton and Brown, *Ill. Fl. N. States and Canada* (ed. 2) 3: 465, 1913; Britton, *Fl. Bermuda*, 398, 1918; Muenscher, *Weeds* (ed. 2) 487, 1955; Rao in *J. Bombay nat. Hist. Soc.* 54: 218, 1956; Gleason and Cronquist, *Man. Vasc. Pl. N.E.U.S., and Canada*, 691, 1963; Santapau in *Indian Fmg.*, 14: 23, 1964; Reed in *Phytologia*, 10: 338, (Fig. 1-7); 1964 J.K. Maheshwari in *Curr. Sci.* 35: 181-183, 1966; Vaid & Nathani *Indian For.* 96(10): 791, 1970.

An erect, tufted, profusely branched leafy herb, 1-1.2 m tall. Stems hairy, scabrid, rigid, angular, longitudinally grooved.

Leaves alternate, 2-8 cm long and up to 5 cm broad, pinnately or bipinnately dissected; segments linear, entire, thin textured; smaller and undivided in the region of the inflorescence or with one to two, minute, lateral lobes and a linear, terminal segment.

Capitula 4-5 mm in diam., heterogamous, numerous, peduncled, in an axillary or terminal leafy, lax, corymb-like cymes. Involucre of usually five outer bracts followed by five inner bracts the latter subtending a female floret with two male florets on either side; male florets in turn enclosed in a bract. Outer bracts ovate, acute, finely hairy in the upper two-third of margin, prominently nerved, about 2.5×1 mm; inner bracts obovate, thin, transparent, up to 2 mm long, margin lined by irregular filmy layers. Female florets jug-shaped, white; corolla cup-shaped with indistinct lobes enclosing style; stigma bifurcated, somewhat exserted; two appendages present at the junction of the lower and upper parts of the floret; ovule single, basal. Male florets developed in pairs along with five female florets on the ray, bracteate; bracts oblanceolate, thin, transparent, lined by irregular filmy layers, enclosing male florets, about 2×2.5 mm. Disc florets all male, yellowish about 1.5 mm long; corolla infundibuliform, lobes distinct, acute, five; stamens five, syngenesious, exserted. Achenes obovate, black, up to 2×1 mm, crowned by the persistent remnants of corolla, appendage and style.

The plant is native in tropical America, from Florida to Texas, locally north to Massachusetts, Pennsylvania, Ohio, Michigan, Illinois, Missouri and Kansas (see Gleason and Cronquist, Report). It has also been collected from West Indies and some parts of South Africa. In India, it is presumed to have been introduced in 1956 along with food grains, especially wheat imported from outside. It was first reported from Maharashtra and has rapidly made further ingress in the northern parts. Apparently it had travelled about 1500 km, northwards from Poona and is now seen in other parts of the country. (Karnataka, Maharashtra, Madhya Pradesh, Delhi, U.P., Jammu & Kashmir etc).

Common name: Parthenium.

Delhi Ridge, J.K. Maheshwari, 5372, August 30, 1964; Moti Bagh, New Delhi, J.K. Maheshwari 5530, August 13, 1965; New Delhi, H.B. Naithani 7197; Near IDPI, Hardwar Road, Rishikesh, H.B. Naithani 3639; Banaras H.B. Naithani Ser. II No. 90.

Fl. & Fr. Practically throughout the year but mostly from Aug.-Dec.

Parthenium is a serious hazard dangerous to people, animals & crops. It has been reported to cause contact dermatitis. The skin on neck, face & arms becomes hard like the skin of the crocodile & develops cracks & sores. Persons allergic to *Parthenium* pollen have fever resembling that of flu & become asthmatic. Animals such as cows & goats that pass over parthenium-infested land become carriers of contact dermatitis. In course of time parthenium is said to destroy all growth of vegetation. It is hardy & completes four life-cycles in a year. Each produces about 10,000 seeds.

According to Hindustan Times, New Delhi dated the 15th August 1975 p. 5 "The University of Agricultural Science (USA) had requested the Government to consider promulgation of an ordinance so that all agencies can be brought together and a coordinated campaign started, "for the eradication of this obnoxious weed." In this connection also see Hindustan Times dated 8th Sept. 1975, p. 3 The serious menace of carrot weed.

Pluchea wallichiana DC. Prodr. 5:451, 1836; Hk. f. in FBI. 3:272, 1881; Raizada & Sharma in Ind. For. 88(5): 361, 1960.

A tall glabrous shrub, 1-2 m high. Leaves alternate 3.5-8 cm \times 1.5-0.3 cm, broadly elliptic or obovate-oblong, surfaces glandular-pubescent, apex mucronulate, rigid, sweet-scented, nerves raised on both surfaces. Heads about 4 mm across in compound corymbs, 0.6-1 \times 0.34 mm (spreading up to 1 cm in diameter on drying) pedunculate as well as sessile in clusters of few on slender more viscous pubescent branchlets. Invol.-bracts ciliolate, persistent; outer invol.-bracts much shorter than inner, ovate-lanceolate, acute, glandular-hairy on exposed surface; inner narrower and acute with a pencil of hairs at the tips. Florets white, all tubular in a head; hermaphrodite, 0.6 cm long only 4-8 in the centre, with purplish long-tailed anthers and style papillose above the middle upwards; pistillate florets numerous, very slender. Pappus 1-seriate, dirty white, antrorsely barbellate. Cypsella about 1 mm long, brown, 5-angled usually with fine few bristles along white angles.

Govt. College walls, Ajmer V.S. Sharma 152; Puskar Road, V. S. Sharma 905; Chamar Ghati, Ajmer Dist. V.S. Sharma.

Fl. & Fr. Cold Season.

Distribution:—Punjab, Sindh, Gujarat, Baluchistan.

This species in a shade loving plant in the area and superficially resembles in heads *P. tomentosa* DC., but the latter differs in being densely tomentose throughout and in the leaves which

are conspicuously dentate-serrate. Further in *P. tomentosa* the hermaphrodite florets are nearly double in length than in *P. wallichiana* with the mouth oblique.

Pseudo-elephantopus spicatus (*Pseudoelephantopus*) (Juss. ex Aubl.) Rohr ex Gleason in Bull. N.Y. Bot. Gard. 4: 242, 1906 and N. Amer. Fl. 33: 109, 1922; Koster in Blumea 1: 465, 1935; Philipson in Journ. Bot. 76: 301, 1938. *Elephantopus spicatus* Juss. ex Aubl. Pl. Guian. 2: 808, 1775; Husain in Ind. For. 93 (8): 583, 1967.

An erect, stiff, 15-70 cm tall herb, branched sometimes from base; stem terete, angular above, strongly striate, pilose. Leaves 57.5 cm long, 0.3-0.4 cm broad, oblanceolate to linear, alternate, crenate-serrate; upper leaves with revolute margins, pilose on both sides along nerves and margins, minutely gland dotted beneath, sub-acute or acute at the apex with subspinescent tip, narrow and sheathing at base, sessile. Heads 11-13 mm long, 4-flowered, homogamous, sessile, in axillary and terminal paniculate stiff spikes; involucre narrowly oblong, slightly compressed; bracts 8, 2-seriate, outer bracts shorter, lanceolate or ovate-lanceolate, keeled, scarious, hyaline, pilose at base and along midribs without, acuminate-cuspidate at apex; inner bracts longer, each 10-11. 5×2.5 -3.25 mm, oblong-lanceolate, scarious, greenish towards apex, with thin membranous hyaline margins sparsely pilose without, cuspidate at apex; receptacle small. Flowers hermaphrodite, irregular, fertile. Corollas 7.8 mm long, white, glabrous with long slender tube, deeply 5-lobed at apex, cleft on one side with lobes spreading sub-palmately; lobes about 2 mm long, linear acute. Anthers appendiculate at apex, sagittate at base. Style thicker upwards. Capsule 4-4.5 mm long compressed, finely 10-ribbed, pubescent densely so along the ribs, minutely glandular, brown, truncate at apex, slightly narrowed at base. Pappus few, about 5 or 6, one on each side longest, each 4-6.5 mm long, vertically folded, shorter, each about 4 mm long, stiff, white, minutely barbellate, dilated and fimbriate at base.

Ukhalana, Aligarh, Husain 285 & 385; Sadhu Ashram, Aligarh, Husain 418.

Fl. Dec.-Feb. Fr. April.

Distribution:—Native of Mexico, Central and South America, Africa, introduced in China, Formosa, Philippines, Malaya Archipelago.

Philipson (l. c.) attributed the combination to Gleason (N. America Fl. 33:109, 1922), but in an earlier publication (Bull. N. Y. Bot. Gard. 4:242, 1906), Gleason himself refers to Rohr's combination, *Pseudo-elephantopus spicatus* obviously

validating it; so, the authority of this binomial should be (Juss. ex Aubl.) Rohr. ex Gleason (1906). The genus, *Pseudo-elephantopus* has been erected by Stend. (Nat-Sessk. Kjab 2:213, 1792), based on the type, *Elephantopus spicatus* Juss. ex Aubl. but later misspelt *Pseudelephantopus* (c.f. Philipson l.c.)

The genus *Pseudo-elephantopus* mainly differs from *Elephantopus* in that in the former heads are in paniculate stiff spikes; pappus bristles one on each side of cypsel a longer and vertically folded, while in the latter, heads in capitulose clusters, pappus bristles all alike. According to Backer & Bakh. f. (Fl. Java 3:655, 1968) the correct authority for *P. spicatus* (Juss.) Gleason is (B. Juss. ex Aubl.) C.F. Backer.

Senecio hewrensis (Dalz.) Hk. f. in FBI. 3:346, 1881; Raizada & Sharma in Ind. For. 88(5): 362, 1962; *Doronicum hewrense* Dalz. in Dalz. & Gibs. Bom. Fl. 130, 1861.

An annual dwarf herb 1-2 cm high. Stems erect, puberulous or scaberulous, leafy; leaves sessile or shortly petioled, 1.5-3 x .2-.6 cm, base auricled lanceolate or oblong-lanceolate, obtuse, coarsely irregularly toothed or subpinnatifid, membranous; involucre bracts 8-10, about 4 mm long, narrowly oblong, rather dilated upwards, acuminate, glabrous; ligules 3; florets 10-12 in a head, yellow, the ray florets 3-4 with a broad spatulate toothed tip having 3-4 parallel nerves. Pappus copious longer than achenes, absent in ligulate florets; achenes broader upwards, scabrid, equalling the dirty white pappus, obscurely 10-ribbed, puberulous in between the ribs only.

Nagpahar Mts., Ajmer Dist., V.S. Sharma 1137.

Fl. & Fr. Aug.-Oct.

Distribution.—Konkan (Junar Hills, Poona District).

Senecio vestitus Berg. Disc. Pl. Cap. 282; Harvey in Harvey & Sonder Fl. Capensis 3:388, 1894; Panigrahi et al in Bull. Bot. Surv. Ind. 9(1-4):255, 1967.

A suffruticose, glabrous and smooth undershrub; stem woody, more or less clasping, terete, finely striate, leafy; leaves stem clasping, broad-based, oblong or obovate, obtuse, membranous, sharply and unqually serrate, netted veined; flowers in patently much-branched corymb, many headed; pedicels scaly, divaricate; heads radiate, 20-30 flowered; involucre calyced, glabrous, of many narrow scales; rays 6-8, yellow; achenes striate, hispidulous.

Fl. Feb.-March.

Tehrighat, Bahraich dist., Panigrahi 10628, in sandy alluvium.

Distribution.—Africa, Australia.

This species is a native of Cape (S. Africa). It is not mentioned in Fl. Br. Ind., or in any of the Provincial Floras, I have consulted. In spite of my persistent request it was not possible to get on loan Panigrahi's specimen from Bahraich for examination. I am also unable to explain how this species of S. Africa could have reached Bahraich. Had I been fortunate to specimen secure the I could have got it compared with Thunberg's specimen (which is in Geneva (DC. Herb.) or Bergies' specimen both of which have been quoted in Fl. Capensis (loc. cit.) as this species; almost certainly this is a case of misidentification.

Silybum marianum (Linn.) Gaertn. Fruct. 2: 378, t. 162/2, 1791; Hk. f. in FBI.3: 364, 1881; Jeffrey in Kew Bull. 22-131, 1968; H.B. Naithani & Gaur in Ind. For. 95 (10): 695, 1969; *Carduus marianus* Linn. Sp. Pl. 823, 1753.

Erect, robust, thistle-like, somewhat glaucescent, annual-biennial herbs, 25-70 cm high. Stems ribbed, cottony. Leaves sessile, pinnatilobed-pinnatifid, with rounded basal auricles and amplexicaule base, acute, crispy, spinescently dentate with yellow brown spines, with a broad pale midrib, lower ones up to 10-30 cm long, upper ones smaller. Heads terminal, solitary, erect or nodding, 4-5 cm long, 2.5-4 cm across; involucre bracts 4-5 (-6)-seriate, outer ones ovate-lanceolate, with a dilated marginally spinescent upper part, gradually narrowed into a long spine, inner lanceolate acute, usually spine-tipped; corolla white, 3 cm long, with reddish-violet or purplish or rarely white-segments; achenes black, pale-blotched, with an apical rim, 0.5-0.6 × 0.3-0.35 cm; pappus-bristles dirty white or pale brown, many-seriate, 1-1.5 cm long; receptacle white or pale brown, pappus of simple hairs.

Bindal Bridge, Dehra Dun, C.R. Babu 34997; Chota Bindal, Dehra Dun, H.B. Naithani 6552; Araghar, Dehra Dun, H.B. Naithani 3249; Clement Town, Dehra Dun, Ram Dayal 879.

Fl. & Fr. March-June.

Distribution.—India (Kashmir, Uttar Pradesh, Himachal Pradesh), Pakistan, Europe, N. Africa, Australia & America.

Solidago canadensis Linn. Sp. Pl. 878, 1753.

A large herb up to 5 m high. Leaves sessile, lanceolate, entire. Heads yellow; pappus hairs white.

Occasionally cultivated in Dehra Dun and also found as an escape, such as in Dalanwala, Dehra Dun, etc. *Raizoda*; Rispana, Dehra Dun, C.R. Babu 34922.

Fl. Sept.-Nov.

Distribution:—India (cultivated), Amer. bor.

Solvia anthemifolia (Juss.) R. Br. ex Lessong, Syn. Compos. 268, 1833; Kitamura in Act. Phytotax. Geobot. 1: 265, 1935; 9: 30, 1940; Hara Fl. E. Himalaya 140, 1971; Bhattacharya in Bull. Bot. Surv. Ind. 5: 375-376, 1963; *Gymnostyles anthemifolia* Juss. in Ann. Mus. Paris 4: 262, 1804.

Flat, diffuse, annual herb, stem much shorter than the leaves, forming dense tufted growths; plant body increasing radially by rigid stolons, rooting below the point of insertion of the sessile heads; roots fibrous, tough. Leaves radical, petiolate, simple, oblong to oblong-lanceolate, 3-10 cm long, finely dissected into minute linear, 1-multifid segments simulating a compound condition; ultimate segments 1-3 mm long and 5-8 mm broad, covered with long strigose simple hairs or sometimes glabrous; base sheathing, almost white, scarious, broadly ovate to nearly cordate, overlapping and aggregating below the heads. Heads sessile, several together, greyish green, enclosed within leaf bases, extremely villous hairy, 2-3 mm in diameter; fruiting heads much enlarged, becoming almost spherical, 8-1 cm in diameter; involucre bracts several, 2 mm long, ovate to ovate lanceolate, nearly equal, in two rows, covered with long simple strigose hairs; margins scarious, white. Receptacle flat, without any scales, extremely villous within; florets in the circumference in several rows, female, apetalous; ovary oblong to elliptic, truncated at the tip, white, with hairs at this region; ovule elliptic; style filiform, hairy, rigid with white papillate outgrowths, much longer than the ovary, straight, terminal slightly notched at the end. Disc florets mostly male or sterile, tubular, pale yellow, 2-3 toothed at apex, gradually tapering towards the base. Sterile florets with prominent pistillode, with or without anthers and mixed up with the fertile males; anthers as many as pales, obtuse at base; pollen warted. Achenes in mature spherical heads compactly arranged, 1.5-2 mm long, dark brown, lenticular, bordered by a thick, transversely rugose pale brown wing, devoid of pappus; style rigid, persistent, with hooked tip.

Nakraunda, Dehra Dun Dist. Raizada s.n.; Agra Raizada; Ramnagar Bhattacharya 20348; Bahraich, Naipalganj Road, C.L. Malhotra 26667; Gurukul, Hardwar, H.B. Naithani 3245; Moradabad, H. B. Naithani 6905; New Forest, Dehra Dun, H.B. Naithani 3986; Mahmudpur, Dist. Farrukhabad, Ram Dayal Dehra Dun Herb. No. 143205; Roorkee Som Deva; Ajabpur, Dehra Dun, Som Deva Dehra Dun Herb. No. 142733.

Fl. & Fr. Feb.-May.

Distribution :—A native of America. Recently introduced in our country and naturalized in various parts of Uttar Pradesh.

Tagetes minuta Linn. Sp. Pl. 887, 1753; Nair & Pant in Bull. Bot. Surv. Ind. 8(1): 74, 1966.

A strongly scented annual herb up to 4 m high. Branches leafy, glabrous; leaves opposite or alternate, pinnate, 7 to 15 cm long. Leaflets 11-19, linear lanceolate, sharply serrate, conspicuously gland dotted, 2-4.5 cm long, midrib very prominent beneath. Heads numerous in crowded cymes at the ends of branches. Involucral bracts united forming a cylindrical tube with 5 rounded free lobes; tube 10 mm long, about 3 mm broad. Ray florets 3-4, yellow, female fertile, rays two lobed, extending 1-2 mm above the involucre, hairy on the back. Disc flowers few, fertile, yellow like the rays; corolla hairy outside, tubular with 5 acute lobes; anthers gland-tipped. Achenes angular, flattened.

Dehra Dun, Parker 27913, 28684; Sahasradhara, Raizada.

Distribution :—A native of America often cultivated, now naturalized in several parts of N.W. Himalaya.

Tagetes patula Linn. Sp. Pl. 887, 1753; Baily, Man. Cult. Pl. ed. 2: 1013, 1949.

Erect strongly aromatic, often much-branched, annual herbs. Leaves opposite or upper ones alternate, leaflets or segments lanceolate-oblong, acutely serrate, with glands along the margins. Heads solitary, often in corymbs, 2.3 cm across, on 3-13 cm long peduncles which are thickened at the top; involucre with 5-7 triangular, acute teeth; ligule of marginal flowers 1-1.5 cm long, yellow with brownish-red markings, emarginate at the apex.

Bindal, Dehra Dun, C.R. Babu 34086.

Fl. Sept.-Dec.

Cultivated as a garden ornamentals often met with as an escape in waste places and road-sides; native of Mexico.

Taraxicum officinale (Weber) Wiggers, Prim. Fl. Holsat. 56, 1780; Backer & Bakh. f. Fl. Java 2:434, 1965; Clarke Comp. Ind. 258, 1876; Hk. f. in FBI. 3:401 1881.

A perennial herb with milky juice. Leaves all radical, sessile, usually glabrous, variable in shape, narrowly oblong, 5-20 cm long, irregularly pinnatifid, lobes linear or triangular, acute, toothed, pointing downwards, or rarely oblanceolate and nearly entire. Heads ligulate, up to 5 cm across, glabrous, solitary on a hollow, leafless stalk 5-20 cm long; inner involucral bracts linear, erect, nearly equal, margins often white, tips

usually thickened or hooked; outer bracts short, ovate, erect or recurved; receptacle flat, naked; flowers yellow; pappus copious, white, not feathery, soft; ligules long, spreading, 3-5-toothed, often brown on the back; style arms long. Achenes glabrous, flattened, ribbed, narrowed to the base, minutely spiny on upper half, abruptly contracted into a long, slender beak crowned by pappus.

Sahasradhara, *Raizada*; New Forests, Dehra Dun *Raizada*; H.B. Naithani 1989.

Fl. Mar.-Nov.

Distribution :—Throughout the temperate Himalaya and Western Tibet from 3000-3600 m; Mishmi Mts; temperate and cold regions of N. & S. hemispheres.

Tithonia diversifolia (Hemsl.) A Gray in Proc. Amer. Acad. 19:5. 1883; Blake in Contr. United Stat. Herb. 20:434, 1921; Bailey Stand. Cycl. Hort. 3352, 1950; *Raizada* in Journ. Ind. Bot. Soc. 14(5): 156, 1936; *Mirasolia diversifolia* Hemsl. Biol. Centr. Amer. Bot. 2:168, t. 47, 1881.

A large shrub, 2-3 m high. Leaves alternate, petiolate, ovate or orbicular, entire or 3-5-lobed, crenate. Heads radiate, 10-12 cm in diameter, solitary axillary and terminal. Florets yellow. Achenes quadrangular. Pappus of scales with 1 or 8 bristles.

Gregarious in wastelands near settled areas at Rajpur, Sub-Himalayan tracts near Dehra Dun *Raizada*, Dehra Dun Herb. No. 96998.; Robber's Cave C. R. Babu 34656; New Forest, Dehra Dun, H.B. Naithani Ser. II. No. 79.

Fl. & Fr. Nov.-Dec.

Distribution :—A native of Mexico and Central America, commonly cultivated and naturalized in the Sub-Himalayan tract near Dehra Dun; Bengal; Philippines.

Verbesina encelioides (Cav.) Benth. & Hk. f. ex A. Gray in Bot. Calif. 1:350, 1878; *Ximenesia encelioides* Cav. Icon. 2:60, 1793; *Raizada* in Journ. Ind. Bot. Soc. 14(4): 156, 1935.

An annual herb; stem densely puberulous, much branched. Leaves deltoid-ovate, thin, alternate or the lowest opposite, narrowed at the base into naked or winged margined petioles, which are often provided with dilated appendages at the base, 5-7.5 cm long, acuminate, coarsely dentate, green and minutely pubescent above, pale and densely canescent beneath. Flower heads peduncled, several, 2.5-5 cm broad, radiate, showy. Involucre hemispheric its bracts lanceolate, rays 12-15, bright

golden-yellow, 3-toothed. Disk-flowers numerous, perfect, fertile, their achenes obovate, winged, pubescent, their pappus of 2-subulate awns, those of the ray-flowers rugose, thickened, often wingless. Anthers sagittate at base. Style branches with slender pubescent appendages.

Saradhra, Ajmer, *A.E. Lawrie* 4712; Jaipur, *P. Maheshwari* Dehra Dun Herb. No. 60396.

Fr. & Fl. June-Sept.

Distribution :—Indigenous to tropical America but now occurs as an escape from cultivation or naturalized often on sandy soil.

Vicoa cernua Dalz. in Dalz. & Gibs. Bom. Fl. 126, 1861; Hk. f. in FBI. 3:297, 1881; Srivastava in Journ. Bom. Nat. Hist. Soc. 53:152, 1955.

An annual, rather slender, sparsely pubescent; lower leaves shortly petioled, elliptic, acuminate, serrate, upper sessile contracted to a small auricled base; involucre bracts squarrose, tips filiform, recurved.

Mirzapur, *Srivastava*.

Fl. & Fr. Apr.-June.

Distribution :—Hills of the Konkan and Western Deccan.

Wedelia chinensis (Osbeck) Merr. in Philip. Journ. Sci. (Bot.) 12:111, 1917 and Enum. 3:611, 1923; Husain in Ind. For. 93(8): 583, 1967; *Solidago chinensis* Osbeck. Dagbok Ostend. Resa 241, 1757; *Verbesina calendulacea* Linn Sp. Pl. 902, 1753; (non *Wedelia calendulacea* Pers. 1807); *Wedelia calendulacea* (Linn.) Less. Syn. Comp. 222, 1832 (non Pers., 1807); Clarke Comp. Ind. 136, 1876; Hk. f. in FBI. 3:306, 1881.

A perennial, much branched, prostrate or decumbent herb with 15-60 cm long branches, ascending up to 20-45 cm high; stems rooting at nodes, terete. Leaves 16-43 by 6-16 mm, oblong, elliptic or lanceolate-oblong, opposite, entire or irregularly crenate-serrate, scaberrulous on both surfaces, sessile or subsessile. Heads 7-11 mm long, 10-17 mm across, heterogamous, solitary axillary or terminal; peduncles 4-9.8 cm long, slender, terete, hispid, swollen beneath heads; involucre campanulate; bracts about 10, more or less 2-seriate, receptacle flat, about 6 mm long, narrowly oblong or oblong-lanceolate, vertically folded, embracing disc-florets, glabrous. Ray-florets female, fertile. Disc-florets hermaphrodite, fertile. Corolla of ray-florets 8-9 mm long, irregular, yellow, glabrous, ligulate; ligules 2-3-lobed. Corolla of disc-florets 4-4.5 mm long, regular, yellow, tubular, limb 5-toothed at apex. Style-arms plano-convex, recurved,

hairy in hermaphrodite florets. Cypselas 3-3.5 mm long, cuneate, oblong, laterally compressed. Pappus 0.5-0.7 mm long, cupular, toothed or fimbriate at apex.

Macchua, Aligarh Dist. Husain 614.

Fl. Jan.-March, Sept.-Nov; Fr. April-July.

Distribution :—In wet places, Bengal, Assam, Bihar, Orissa, plains of South India, the Eastern & Western Peninsula, Bangladesh; Ceylon, Malaya, China, Japan.

The widely used binomial, *Wedelia calendulacea* (L.) Less. (1832), cannot be applied to this plant, since it is illegitimate by being a later homonym of the Mexican plant, *Wedelia calendulacea* Pers. (1807). An alternative earliest epithet for this plant being *Solidago chinensis* Osbeck (1757) the legitimate binomial for this plant is *Wedelia chinensis* (Osbeck) Merrill (1917).

STYLIDACEÆ

Stylidium tenellum Swartz, in Gesellsch. Nat. Berlin Mag. 1:51, t. 2. f. 3, 1807 (nec R. Br. 1810); Clarke in Hk. f. FBI. 3:420, 1881; Sloot in Fl. Males. Ser. 1. 4:530, 1954; Raizada & Saxena in Ind. For. 88(9) : 701, 1962.

An erect herb, 3-12 cm high with adventitious roots. Leaves scattered, oblong, or oblong-obovate, smaller upwards, passing into linear bracts at the cyme forks. Flowers sessile at the cyme forks. Calyx brown, superior, 2-lipped, upper lip 2-lobed, the lower 3-lobed, the tube adnate to the ovary and marked with two opposite longitudinal fissures so that the two calyx-lips appear to be separate up to the base of the tube; calyx sparsely glandular hairy on the outer surface of the lobes and on the upper portion of the tube. Corolla white and sparsely glandular-hairy outside, pink-purple inside, epigynous, irregular, split above in 4 radiating lobes, the two middle larger and notched, the fifth dorsal smaller, recurved and with yellowish tinge. Column exserted and geniculate, with yellowish tinge. Capsule linear about 1.5 cm; valves united at top and base, patently gland-hairy.

Rajpur on grassy slopes near Sal Forest, occasionally in marshy spots, among grass, Saxena 2295, 2328; Rajpur, C.R. Babu 34935.

Fl. & Fr. Oct.-Nov.

Distribution:—Chota Nagpur, Hazaribagh, Manbhum, Bangladesh, Burma, Malacca.

CAMPANULACEAE (incl. Lobeliaceae)

Campanula benthamii Wall. (Cat No 1290. 1829 nom. nud.) ex Kitamura Fl. Afgh. 377, 1960; Thaker & Sabnis in Journ. Bom. Nat. Hist. Soc. 69 (1): 228, 1972; *C. canescens* Wall. (Cat. No. 1289 nom. nud.) ex A.D.C. Prodr. 7: 473, 1839 (non Roth 1827); Hk. f. & Th. in Journ. Linn. Soc. 2:23, 1857; Boiss. Fl. Orient. 3: 934, 1875; Clarke in Hk. f. Fl. Br. Ind. 3: 439, 1881; Duthie Fl. U.G.P. 1: 499, 1903; *C. wallichii* C.R. Babu in Journ. Bom. Nat. Hist. Soc. 68 (3): 808-809, 1968.

An erect multicauline annual herb. Stem patently hairy. Basal leaves in a rosette, narrowed into a short petiole, obovate-spathulate, higher ones sessile, linear-lanceolate-oblong, sub-acute, all leaves subentire-crenulate, hispidly pubescent, 1.5-8 x 0.3-2 cm. Flowers solitary, sessile, forming a spiciform panicle, 0.5-0.8 cm long; calyx lobes linear-lanceolate, subequal, entire, hairy; corolla pale purple or lilac, hairy on the outside, divided less than half way down. Capsule hemispheric hispidly hairy.

Rispana, Dehra Dun, C. R. Babu 35266; New Forest, Dehra Dun, H. B. Naithani 1529, common on old walls.

Fl. & Fr. Jan.-May.

As *C. canescens* Wall. ex DC. (1839), the oldest name, is illegitimate being a later homonym of *C. canescens* Roth (1827), & since there is no other valid legitimate name or epithet for this plant Kitamura proposed (loc. cit.) the name *C. benthamii* for this plant. Babu's name *C. wallichii* (loc. cit.) is superfluous as Kitamura's name (1960) is earlier.

This species already mentioned by Duthie in his Flora differs from *C. colorata* Wall. in that in this species flowers are 0.5-.6 cm long, calyx lobes 0.2-0.35 cm long, while in *C. colorata*, flowers are up to 1.5 cm long, calyx-lobes up to 0.6 cm long; perennial.

Campanula colorata Wall. ex Roxb. Fl. Ind. ed. Carey & Wall. 2: 101, 1828; Clarke in Hk.f. FBI. 3: 440, 1881; Kitamura in Fauna & Fl. Nepal Himal. 239, 1955 et in Fl. Afgh. 379, 1960; Som Deva in Bull. Bot. Surv. Ind. 10 (2): 180, 1968; *Campanula ramulosa* Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2: 101, 1824.

Suberect, ascending or straggling, multicauline, perennial herbs, with a somewhat woody base and stout root stock. Stems flexuous, simple or sparingly branched, patent-hairy. Leaves tapering into a short petiole, oblanceolate-spathulate-oblong, with a narrowed base, acute or obtuse, irregularly coarsely ser-

rate-dentate, pilose, 1-7 (-8) \times 0.2-1.5 (-2) cm; flowers in clusters or panicles; calyx lobes lanceolate, acute, subentire, pilose; corolla pale purple or lilac, hairy without, divided halfway, 0.8-1 cm long, lobes obovate, obtuse, 0.4-0.45 cm. Capsule hemispheric, hairy, 0.5 \times 0.5 cm; seeds 0.03-0.04 \times 0.02 cm; sterile flowers with small calyx-teeth and without corolla and stamens.

Robber's Cave, *C.R. Babu* 22065; Robber's Cave, Dehra Dun *Som Deva* 1323; Sahasradhara, *Som Deva* 1716; *Raizada* s.n.

Rare; on shady dry rocks and hill cliffs.

Fl. & Fr. Nov.-July.

Distribution:—N. W. Himalaya, 1000-3300 m, and between 1650-2300 m in the Himalaya, between 1650-5300 m in Western Ghats. Afghanistan.

Specimens from this area are referable to the typical variety which is closely allied to var. *tibetica* Hook.f. & Thoms., but can be distinguished by lanceolate calyx-lobes which are not imbricate basely. Whereas var. *tibetica* is characterised by broadly ovate calyx-lobes which are overlapping at the base.

According to Art. 57 of I.C.B.N. (1972), the correct name of this plant should be *C. colorata* Wall., since Clarke (FBI. 3: 440, 1881) seems to be first who united both *C. colorata* Wall. (1824) and *C. ramulosa* Wall. (1824) having the same date of publication, and adopted the former name for the combined taxon.

Lobelia rosea Wall. Pl. As. Rar. 2: 42, t. 152, 1831; Clarke in Hk.f. FBI. 3: 427, 1881; *Raizada* in Journ. Ind. Bot. Soc. 14(4): 156, 1935.

A tall stout herb 0.7-2 m high. Leaves subsessile, 15-38 cm long, 3-9 cm broad, velvety above, minutely toothed. Flowers in terminal racemes, crowded. Calyx pilose, teeth linear, minute, toothed. Corolla 2 cm, white or rose; anthers usually very hairy on the back, tips of 2 lower bearded. Capsule about 1 cm in diameter, subglobose; seeds ellipsoid, compressed.

Mundiapani, Kalagarh division, *A.E. Osmaston* 1314.

Fl. & Fr. March-May.

Distribution:—Subtropical Himalaya, from Kumaon to Bhutan and Khasi Mountains; Terai of North Bengal and Assam; Martban, Ava.

PRIMULACEAE

Lysimachia alternifolia Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2: 26, 1832; Hk. f. in FBI. 3: 504, 1882; Collett. Fl.

Siml. 302, 1902; S. K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5 (1 & 2): 39, 1971.

A decumbent, pubescent or slightly hairy herb; stems decumbent 15-30 cm, branching from the base. Leaves alternate, ovate-lanceolate, $2.5-3 \times 1.5-2.2$ cm, stalked or the upper ones nearly sessile, acute. Flowers yellow, solitary, axillary; stalks slender, as long or nearly as long as the leaves. Calyx longer than corolla. Corolla rotate, .7 cm across. Stamens 5, inserted at the base of corolla. filaments united at the base; anthers included. Ovary globose; style slender, persistent; ovules many. Capsule small, globose, splitting from the top by valves; seeds numerous, minute.

Sahasradhara, on moist rocks, *S.K. Malhotra* 30791.

Fl. & Fr. Jan.-April.

Distribution:—Simla and Bhutan 6000-15000 m.

I am unable to explain the occurrence of this species in Sahasradhara; my feeling is that it must have been collected from a much higher elevation possibly above 1000 m or near about. I have never seen or collected it during my innumerable visits to Sahasradhara.

Lysimachia japonica Thunb. Fl. Jap. 83, 1784; Hk.f. in FBI. 3: 505, 1882; Pax & Kunth in Pfreich. 22: 262, 1905; Backer & Bakh f. Fl. Java 2: 443, 1965; Collett, Fl. Sim. 302, 1902; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 6(1): 41, 1971.

A prostrate or decumbent hairy herb, 10-30 cm long. Stem rooting at the lower points. Leaves opposite, petiolate, ovate, lamina about 1.5×2.2 cm, entire. Flowers solitary or in pairs, axillary on short peduncles. Calyx 5-partite, longer than the corolla. Corolla yellow, rotate, about 8-9 mm long. Filaments at the base; anthers included.

Sahasradhara, along moist rocky slopes, *S.K. Malhotra* 33941.

Fl. & Fr. June-Oct.

Distribution:—Temperate Himalaya from Kashmir to Bhutan, 900-2400 m, Khasi Mts. India to Korea and Japan, S. China, Formosa, Java, N. Australia, Philippines.

Lysimachia pyramidalis Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2: 28, 1824; Kunth in Pfreich. 22: 296, 1905; Hand.-Mazz. in Notes Roy. Bot. Gard. Edinb 16: 110, 1928; Hk.f. in FBI. 3: 503, 1882; Raizada in Journ. Ind. Bot. Soc. 14(4): 157, 1935.

An erect glabrous herb 25-60 cm high. Leaves alternate, nearly sessile, narrowly lanceolate, 1-7.5 cm long, upper ones smaller, minutely gland-dotted. Racemes long, lax-flowered, pedicels 6 cm, fruiting 1 cm; bracts linear. Flowers pale-purple or white. Lobes cranulate or toothed, obovate, longer than the sepals, bell-shaped, about 1 cm across; capsule bursting irregularly.

Near Dehra Dun, Duthie 2583; Robber's Cave C.R. Babu 32245; Raizada s.n.

Fr. & Fl. June-Nov.

Distribution:—Central and Western Himalaya from Simla and Central Nepal to Kumaon, between 1650-2640 m.

While dealing with the family Primulaceae, I consider it desirable to mention that recently the genus *Androsace* (Linn. 1753; 1754) which till recently was treated as a distinct genus by almost all botanists, has been reduced to a synonym of the genus *Primula* Linn., by Bentvelzen (Fl. Mal. Ser. 1, 6:186-187, 1962), as he found no reason to maintain the genus *Androsace* which is distinguished from *Primula* by only white corolla with a short-tube in contrast to yellow corolla with a long-tube of *Primula*. Further he strengthened his view by referring to Franchet's (Bull. Soc. Bot. Fr. 33:63, 1886) as well as Pax's opinions (Bot. Jahrb. 10:133-136, 1888) who admitted that there are intermediate species which connect *Androsace* with *Primula*, but still maintained them as distinct genera. However, I follow Bentvelzen (loc. cit.) in treating *Androsace* Linn. as a synonym of *Primula* Linn. as his new conspectus is more logical and sound and reasonable taxonomically.

Closely allied to *Androsace saxifragifolia* Bunge (= *Primula umbellata* (Lour.) Benth.) is *Androsace rotundifolia* Hardw. in Asiat. Res. 6:350, 1799 but the latter can be easily recognized by its larger leaves, larger flowers and larger leafy crenate bracts. When this taxon is transferred to the genus *Primula* its name would be *Primula rotundifolia* but this name is already preoccupied by *Primula rotundifolia* Wall. (in Roxb. Fl. Ind. ed. Carey & Wall. 2:18, 1824) and hence a new name is necessary and I propose, *Primula paritoshensis* Raizada nom. nov., to commemorate the name of my grandson, Paritosh, who actually drew my attention that the name *Primula rotundifolia* is already preoccupied, a fact which I had overlooked.

Both *Primula floribunda* Wall. (Tent. Fl. Nepal 43, t. 33, 1826) and *Androsace saxifragifolia* Bunge (in Mem. Acad. St. Petersburg. 2:127, 1835) have been reported by Duthie in his Flora from the Upper Gangetic Plain. The correct name for *Androsace saxifra-*

gifolia Bunge is now *Primula umbellata* (Lour.) Bentvelzen as shown below :

Primula umbellata (Lour.) Benth. in Fl. Males. (Ser. 1) 6:191, 1962; *Drosera umbellata* Lour. Fl. Cochinch. 186. 1790; *Androsace saxifragifolia* Bunge in Mem. Acad. St. Petersburg. 2: 127, 1835; Hk. f. in FBI. 3:496, 1882; Duthie FUGP 2:4, 1911; *Androsace umbellata* (Lour.) Merr. in Philip. Journ. Sc. 15:237, 1919 et Enum. Philip. Flow. Pl. 3:27, 1923; Hand.-Mazz. in Notes Roy. Bot. Gard. Edinb. 16:162, 1928.

Primula umbellata (Lour.) Benth., differs from *P. floribunda* Wall. in that the flowers are white and corolla-tube short in the former while the flowers are yellow and corolla-tube well-developed in *P. floribunda*.

Primula paritoshensis Raizada nom. nov., *Androsace rotundifolia* Hardw. in As. Res. 6:35., 1799; Hk. f. in FBI. 3:496, 1882; Collett, Fl. Sim. 300, 1902; Pax & Knuth in Pfreich. 22:176, 1905; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5: (1 & 2):39, 1970.

A herb, 5-15 cm high. Leaves all radical, lax, petiolate, orbicular, cordate, lobulate, lobules mostly 3-crenate or toothed. Flowers in involucre umbels, terminal on slender erect, tufted scapes. Invol. bracts wedge-shaped, deeply 3-5-cleft at the broader end. Calyx deeply 5-cleft, enlarging and spreading in fruit. Corolla pink-purple varying to nearly white, salver-shaped, tube shorter than the calyx, limb 5-lobed, spreading.

Sahasradhara, in rocky crevices, S. K. Malhotra 33913.

Fl. & Fr. May-Sept.

Distribution:—W. Himalaya 1500-3300 m.

In all probability the seeds of this species may have got washed down in the currents from the hills above and got entangled in crevices of the rocks as this species is gregarious on shady, moist hill slopes, 1500-2000 m in Mussoorie.

Incidentally it may be pointed that the Indian plant known as *P. saxifragifolia* (Bunge) O.K., seems to be different from *P. umbellata* (Lour.) Benth., as the description of *P. umbellata* given by Bentvelzen (loc. cit.) is not covering the characteristics of the Indian specimens. He noted that leaves are elliptic with a truncate base, of about 1 cm, across, eglandular hairy penducles, and 1 cm long, linear bracts, but the Indian material is characterised by orbicular-subremiform leaves of 2 cm across, with a cordate base, gland hairy, peduncle and ovate-lanceolate, 3-5 cm long bracts. This indicates that *P. umbellata* (Lour.) Benth., may represent the plants of Indo-Chinese region. (i.e.

China, Japan, Formosa, Malysia and Philippines), whereas *P. saxifragifolia* (Bung.) O.K., is probably exclusively Indian.

MYRSINACEÆ

Ardisia floribunda Wall. in Roxb. Fl. Ind. (ed. 1) 2:272, 1824; Mez, in Pfreich. 9:107, 1902; Clarke in FBI. 3:522, 1882 (under *A. nerifolia* Wall.); Raizada in Journ. Ind. Bot. Soc. 14 (4): 157, 1935.

A large shrub or small tree; young shoots and inflorescence minutely rusty tomentose. Leaves narrowly oblong-lanceolate, entire, 12-18 cm long, 2.5-2.9 cm broad, lateral nerves obscure. Flowers small, red, in terminal compound panicles; bracts, linear; calyx-lobes ovate, acute, minutely rusty. Berry deep red, globose-pentagonal, scarcely depressed, 0.75 cm across.

Birani Naddi, near Dehra Dun, *Duthie* 2564; Bhalon, Ramnagar division 668 m, *A.E. Osmaston* 1177.

Fl. May-June. Fr. Sept.

Distribution:—Sub-tropical Himalaya from Kumaon to Bhutan, Khasi Mountains.

Maesa indica (Roxb.) A. DC. in Trans. Linn. Soc. 17:134, 1834; Clarke in Hk. f. FBI. 3: 509, 1882; Mez in Pfreich. 9:29, 1902; Walker in Philipp. Journ. Sci., (Bot.) 73:40, t. 6, 1940; Raizada in Journ. Ind. Bot. Soc. 14(4): 157, 1935; P.C. Kanjilal in For. Fl. Plains Uttar Pradesh 396, 1966; *Baeobolrys indica* Roxb. (Hort. Beng. 16, 1814 nom. nud.), Fl. Ind. 1:557, 1832.

A large shrub with long straggling branches. Leaves petiolate, lanceolate, ovate-lanceolate or oblong-lanceolate; lamina 7-13 cm long, 3-5 cm broad, distinctly serrate-dentate. Flowers in simple or compound axillary racemes much longer than the petiole; pedicels short. Calyx-tube adnate to the ovary. Corolla white, twice as long as the calyx, 5-fid; lobes rounded. Berries pinkish-white when ripe, globose, succulent, often green, drying hard, almost covered with the persistent calyx-lobes and usually tipped with the style.

Near Gurkha Lines, Dehra Dun, *W. Gollan*; near Dehra Dun, *Duthie* 2565; Nakhatal, Pilibhit *P.C. Kanjilal*; rare.

Fl. Feb.-March (sometimes in rains). Fr. April (in cold season).

Distribution:—Himalaya up to 1950 m; Africa.

Myrsine africana Linn. Sp. Pl. 196, 1753; Clarke in Hk. f. FBI. 3:511, 1882; Mez in Pfreich. 9:340, t. 58, 1902; Collett, Fl. Sim. 304, t. 94, 1902; Walker in Philip. Journ. Sci. (Bot.) 73:185, 1940; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1&2): 39, 1971.

An evergreen shrub, 1-2 m high, with ferruginous pubescent branches and petioles. Leaves shortly petiolate, lanceolate, ovate or obovate, about 2×0.8 cm, shortly cuspidate-serrate, with red glands. Flowers small, subsessile, in axillary fascicles. Calyx and corolla 4 lobed, with red glands. Corolla light-reddish. Anthers dark red, exceeding the corolla. Fruit red, dark purple or black when ripe, globose about 5 mm across.

Sahasradhara, along the slopes, S. K. Malhotra 30791; Sahasradhara, Raizada.

Fl. March-May. Fr. April-Oct. to Nov.-Dec.

Distribution:—Temperate and subtropical Himalaya, 600-2700 m from Kashmir and Salt Range to Nepal; Afghanistan, Africa, Arabia, Tibet and China to Formosa.

EBENACEÆ

Diospyros holeana Gupta & Kanjilal in Ind. For. 50:254, 1924; Raizada in Journ. Ind. Bot. Soc. 14(4): 157, 1935; P.C. Kanjilal in For. Fl. Plains Uttar Pradesh 406, 1966.

A medium-sized tree with dark rough bark exfoliating in small plates. Leaves alternate, elliptic or oblong-elliptic, 10-17 cm long, 3-9 mm broad, coriaceous, glabrous. Male flowers 3-4 together, subsessile; peduncle 2-3 mm long, ferruginous-tomentose. Calyx brown, pubescent, cup-shaped, teeth 4-5, acute, ciliate. Corolla tubular 0.6-0.8 cm long, densely silky pubescent outside, glabrous within. Stamens 16 in pairs; pistillode rudimentary, villous; female flowers axillary, solitary, subsessile. Calyx broadly crateriform, about 1.2 mm across, lobes 4-5, broadly ovate-acute, pubescent. Corolla 1.4 cm long, urceolate, densely brown silky pubescent. Stamines 11, pointed at apex. Ovary villous, 6-celled; styles 3. Fruit about 2.7 cm across, globose, seated on the accrescent calyx, glabrescent.

Sungarah Forest, Gonda division, P.C. Kanjilal 2440, 2441, 2441-a; rare.

Fl. April-May. Fr. Jan.

This species resembles *D. embryopteris* Pers. (= *D. malabarica* (Desr.) Kostel) when not in flowers but differs mainly by the more pubescent flowers, fewer stamens, villous ovary and glabrescent fruits.

OLEACEÆ

Jasminum auriculatum Vahl, Symb. 3:1, 1794; Clarke in Hk. f. FBI. 3:600, 1882; Raizada in Journ. Ind. Bot. Soc. 14(4): 158, 1935.

A dextrosely climbing shrub with striate and pubescent branches. Leaves 1-3-foliate, the lateral leaflets mere auricles. Cymes compound, many-flowered, terminal, paniculate, grey-pubescent. Flowers white, fragrant, 0.6-0.8 cm across; calyx teeth minute, narrowly oblong. Corolla lobes elliptic. Ripe carpels usually 0.4-0.8 cm across, globose, black when ripe.

Forest near Bant, Bundelkhand, *Duthie* 6986; Saugor *D.O. Witt*; Etawah, *Hole* Dehra Dun Herb. No. 25023.

Fl. Sept. Fr. Cold season.

Distribution :—Deccan Peninsula & Ceylon (cultivated in Sindh, North West India, Bengal, Siam and Mauritius).

Ligustrum robustum Bl. Mus. Bot. 1:313 1850; Clarke in Hk. f. FBI. 3:314, 1882; Osmaston For. Fl. Kumaon 341, 1927; Raizada in Journ. Ind. Bot. Soc. 14(4) : 158, 1935.

A small tree about 8-10 m high. Leaves 5-10 cm long, 2.5-4 cm broad, ovate-lanceolate or elliptic. Panicles 15-30 cm long, pyramidal, pubescent or villous. Calyx campanulate, glabrous 2 cm long, minutely 4-toothed. Corolla-tube equal to the calyx or nearly so, white. Drupe cylindric, often curved and more or less glaucous, narrowly oblong.

Goliapani, Haldwani division, *A.E. Osmaston* 1283; Chini, Haldwani division, *R. N. Parker* Dehra Dun Herb. No. 45200 and 45201.

Fl. June-July.

Distribution :—East Bengal plain, Silhet, Dacca, Chattagong; Burma, Malaya.

APOCYNACEAE

Baumontia grandiflora Wall. Tent. Fl. Nepal. 15, t. 7, 1824; Hk. f. FBI. 3:60, 1882; Bor & Raizada in Beaut. Ind Shrubs & Climbers 206, 1954.

A huge, evergreen climber with milky juice. Leaves opposite, exstipulate, 10-20 × 7-10 cm, elliptic to obovate, abruptly acuminate with 7-16 pairs of nerves; petiole up to 2.5 cm long. Flowers fragrant, large, pure white, in terminal cymes, subtended by foliar bracts. Calyx of five oblanceolate, obovate or lanceolate, acuminate, segments often glandular within, about 4 cm long, campanulate. Stamens 5. Ovary superior, seated on a 5-lobed disk, 2-celled, with many ovules in each cell. Fruit long, thick, woody, eventually dividing into two horizontally spreading follicles.

Cultivated as a creeper on walls around bungalows and in gardens for its white, fragrant trumpet-shaped flowers.

Fl. Mar.-Apr. *Fr.* Cold season.

Distribution.—Native of Eastern Himalayas, now frequently cultivated in gardens throughout India.

Catharanthus G. Don (1838).

Now accepted as distinct from *Vinca* Linn. (1753; 1754) by almost all authors. It is distinguished from *Vinca* Linn. by almost sessile clustered flowers, salver-shaped corolla with a cylindric tube and sessile stamens, with short filaments and appendiculate anthers. (vide, Lawrence in Bailey 7:113-119, 1959).

Stearn (Lloydia 29:196-200, 1966) pointed out that the correct generic name for this taxon is *Catharanthus* G. Don (Gen. Syst. 4:95. March-April, 1838), not *Lochnera* Reichnb. (Consp. Reg. Veget. 1:134, 1828 nomen) ex Endl. (Gen. Pl. 583. no 3406, Aug. 1838), which has been adopted by Schumann in Pflanzenfam. IV. 2:145, 1895) and advocated and revived by Dwyer (Lloydia 27:282-285, 1964), as *Catharanthus* G. Don (Apr. 1838) is an earlier name than *Lochnera* Reichnb. ex Endl. (Aug. 1838) which is an illegitimate name by being not only a later name, but also a later homonym of *Lochnera* Scop. (1777).

Catharanthus roseus (Linn.) G. Don, Gen. Syst. 4:95 (March-Apr., 1838); Stearn in Lloydia 29:196-200, 1966. *Vinca rosea* Linn. Syst. Nat. ed 10. 944, 1759. *Lochnera rosea* (Linn.) Spach. Hist. Nat. Veg. Phan. 8:526, 1836; Dwyer in Lloydia 27:282-285, 1964.

An erect, perennial herb, stems widely branched. Leaves oblong or oblong-obovate, with an acute base, obtuse or rounded, apiculate, finely pubescent, 2.5-10 cm long pedicel; calyx 0.6 cm long, lobes hairy; corolla white with yellow-centre or pink with dark-red centre, tube 2.5-3 cm long, hairy above and below the anther within, limb 3-4 cm across. Follicles 2-3 cm long, patent-hairy.

Naturalized in Dehra Dun in waste places, road sides and old rocks. Raizada; often cultivated as a garden ornamental; native of West Indies.

Chonemorpha fragrans (Moon) Alston in Ann. Roy. Bot. Gard. Peradeneya 11:203, 1923; Backer & Bakh f. Fl. Java 2:239, 1965; *Echites fragrans* Moon Cat. Pl. Ceylon 20, 1821; *Chonemorpha macrophylla* (Roxb.) G. Don. Gen. Syst. 4:76, 1837; Hk. f. in FBI. 3:661, 1882; Raizada in Journ. Ind. Bot. Soc. 14(4): 159, 1935; *Echites macrophylla* Roxb. Hort. Beng. 20, 1814 nom

nud; Fl. Ind. 2:13, 1824 non H.B.K. Nov. Gen. & Sp. 3:218, 1815-25; T. Seng in Sunyatsenea 3(2-3) : 152, 1936.

A large climbing shrub with lenticellate branches. Leaves variable, 15-38 cm long, 12-25 cm broad, broadly elliptic, obovate or sub-orbicular; lateral nerves 10-12 pairs. Flowers large in erect, terminal racemose, pubescent cymes often 12-22 cm long. Corolla salver-shaped, white, scented, 9 cm or more across. Follicles 22-30 cm long, .2 cm broad, slightly divergent at the base, glabrous.

Near Robber's Cave, Dehra Dun *R.N. Parker* Dehra Dun Herb. No. 37771.

Fl. June-July.

Distribution.—Moist forests throughout India from Kumaon to Travancore, Andaman Islands, Ceylon, Malacca, Java, Sumatra.

Rauvolfia tetraphylla Linn. Sp. Pl. 208, 1753; *Sulochana* in Journ. Ind. Bot. Soc. 38 (4): 586, 1959; *Rauvolfia canescens* Linn. Sp. Pl. (ed. 2): 303, 1762; Raizada in Journ. Ind. Bot. Soc. 14(4):158, 1935; P.C. Kanjilal in For. Fl. Uttar Pradesh 426, 1966.

A dichotomously branching dwarf woody shrub, with milky juice, 0.3-1 m high. Leaves 3-4 at a node with two unequal pairs, 8-12 cm long, 1.8-3.5 cm broad, elliptic, acute at apex, cuneate at base, puberulous above tomentose below, ciliolate on the margin. Flowers very small, white, in terminal and lateral umbellate cymes; calyx urceolate; corolla tube pubescent, 4 cm long. Drupe 5-6 mm across, globular, green when raw, becoming deep-red to black when ripe, seated on somewhat enlarged calyx.

Jhamjuiya, Saugor, *D.O. Witt*; Bichpuri, Agra, *Raizada*, *B.P. Paliwal*; Mirzapur, *Bhattacharyya* 12843, 18325; Rajghat Bundelkhand, *Kanjilal*, probably an escape.

Fl. & Fr. Feb.-May.

Distribution.—A native of West Indies, cultivated and found as an escape in various parts of India, (Southern parts of Andhra Pradesh, Bihar etc.)

Rhynchodia verrucosa (Bl.) Woodson in Sunyatsenea 3:102, 1961; Backer & Bakh. f. Fl Java. 2:237, 1965; *Tabernaemontana verrucosa* Blume, Bidj. 1029, 1825; *Cercocoma wallichii* Miq. Fl. Ind. Bat. 2:445, 1857; *Rhynchodia wallichii* Benth. in Gen. Pl. 2:720, 1862; Hk. f. in FBI. 3:667, 1882; Raizada in Journ. Ind. Bot. Soc. 14(4) : 159, 1935; *Rhynchodia rhynchosperma* (Wall.) K. Schum. in Pfam. 42:173, 1897; 1895; *Echites rhynchosperma*

Wall in Pl. As. Rar. t. 49, 1830; *Trachelospermum verrucosum* (Bl.) Boerl. Fl. Ned. Ind. 2:400, 1899.

A large woody evergreen climber with tubercled branches and milky juice. Leaves opposite, membranous, ovate or elliptic, acuminate, 12.5-23 cm long, 6 cm broad. Flowers showy, white, fragrant, 2 cm across in short, subterminal corymbose panicles of cymes which are 7 cm across. Calyx-lobes ovate-lanceolate, half as long as the corolla-tube. Corolla tube glabrous about 0.7 cm long. Follicles about 25-30 cm long. Seeds ovate or oblong, compressed, beak slender, tipped by a deciduous coma.

Dhamara Range, Pilibhit division, Sri Ram 1368; Pilibhit division, A.E. Osmaston, 1422.

Fl. April Fr. ripen March.

Distribution :—Sikkim Himalaya, Sylhet, Assam, Burma.

Trachelospermum divaricatum (Thunb.) K. Schum. in Engl. & Prantl, Pflanz IV. 2:173, 1895 in err. *Trachelospermum jasminoides* (Lindl.) Lem. var. *heterophyllum* T. Song. in Synyatsenea 2:146. 1934; *Nerium divaricatum* Thunb. Fl. Jap. 110, 1789 non Linn. 1753; *Trachelospermum jasminoides* (Lindl.) Lem. Jard. Fleur. 1: t. 61, 1851; Bailey, Man. Cult. Pl. 811, 1949; C.K. Schneider in Sargent. Pl. Wils. 3:334, 1916; Woodson in Synyatsenea 3(2-3): 14. 1936; Bor & Raizada in Beaut. Ind. Shrubs & Climbers 213, f. 126, 1954.

An evergreen climbing shrub. Leaves petiolate, opposite, elliptic, elliptic-lanceolate or oblanceolate, 5-10 × 2.5-4 cm, glossy above. Flowers white in terminal or axillary, lax cymes, very fragrant, jasmine-like. Calyx divided almost to the base into 5-reflected lanceolate ciliate segments. Corolla-tube 0.8-1.2 cm long, abruptly contracted below the middle, ending above in five lobes. Stamens five, sessile on the corolla, connivent into a cone round and adherent to the stigma. Ovary of two, carpels, with five large glands at the base, two united, three free.

Cultivated as a creeper on walls or trellis in gardens for its delightfully fragrant flowers.

Fl. March-April. Fr. Cold season.

Distribution :—Indigenous to China and Japan, now commonly grown in gardens throughout India.

Incidentally the correct name of *Trachelospermum fragrans* Hook. f. (Fl. Br. Ind. 3:667. 1882; Duthie Fl. U.G.P. 2:41. 1911) is *Trachelospermum lucidum* (Don.) K. Schum., as it is based on *Alstonia lucida* Don, Prodr. 231, 1825.

ASCLEPIADACEAE 149
 ASCLEPIADACEÆ (Incl. PERIPLOCACEAE)

Asclepias curassavica Linn. Sp. Pl. 215, 1753; Hk. f. in F.B.I. 4:18, 1883; Woodson in Ann. Missouri Bot. Gard. 41 (1): 59, 1951; Raizada in Journ. Ind. Bot. Soc. 14(4): 159, 1935; Backer & Bakh. f. Fl. Java 2:251, 1965.

An erect under shrub, 0.5-1.5 m high. Leaves opposite, lanceolate, membranous, 8-11 cm long, 1.2-2.2 cm broad, acute at both ends; flowers attractive, in extra-axillary umbellate cymes. Corolla bright crimson or light orange, lobes reflexed in flower, valvate in bud. Corona saffron yellow, staminal of 5 erect lobes; pollen masses solitary in each cell, pendulous, flattened, waxy. Follicles solitary, erect, 6-9 cm long, lanceolate, beaked, glabrous, green. Seeds ovoid, dark brown; coma 2.9 cm long.

Completely naturalized in many parts of Dehra Dun and Saharanpur District, chiefly along water-courses, *Raizada*.

Fl. & Fr. Practically all the year round.

Distribution :—Native of West Indies, naturalized throughout the tropics.

Ceropegia angustifolia Wt., Contr. Bot. Ind. 31, 1834; Hk. f. in F.B.I. 4:72, 1883; Huber in Mem. Soc. Biol. 12:1-203, 1957.

A slender, perennial twining herb, with fasciculated, fusiform tuberous roots. Stems terete, nearly glabrous except a single line of patent hairs, often purple-blotched. Leaves ovate-elliptic oblong, with a rounded base, acuminate, entire-repand, membranous, glabrous or thinly hispidly hairy, with 6-8 arching lateral nerves, 5-15 × 3-8 cm. Flowers between the petioles of a leaf pair, in solitary, peduncled, 4-8 flowered cymes. Peduncle 0.5-1 cm long; patent-hairy on one side longitudinally; bracts linear-subulate, 0.3-0.5 cm long; peduncles patent hairy, 1-2 (2.5) cm long; calyx-segments linear, glabrous, 0.5-0.8 (—1) cm long; corolla 5-6 cm long, funnel-shaped at the top, greenish and hairy without, dark-purple and glabrous within, segments cohering by means of air-ribs on the hard, emarginate top, longitudinally conduplicate, with a broad ovate base, ash coloured in the upper part, greenish in the lower part, 2-3 cm long, glabrous; outer corona-scales 5, ovate, deeply 2-fid, purple-blotched, with linear-subulate, long ciliate tips, appendage linear-narrowly oblong, obtuse, adnate to the connective at the base, erect higher up, glabrous, 0.5-0.6 cm long; staminal column short, anthers oblong, pollinia reniform; stigma 5-angled. Fruits not seen.

Bindal, Dehra Dun, C.R. Babu 32215, 32215-a.

This species is not uncommon in scrub-jungles, ravine-slopes and forest-edges.

Fl. July-Oct.

Raizada (Journ. Ind. Bot. Soc. 14(41:160, 1936) who first reported this for the Upper Gangetic Plain from Dehra Dun, identified it at first as *C. macrantha* Wt. and a little later (Ind. For. Rec. (n. s.) Botany 4(3) : 68, 1950) as *C. angustifolia* Wt. Similar specimens in the herbarium of CAL. were identified by Huber, who monographed the genus *Ceropegia* Linn., [Mem. Soc. Biol. 12:1-203, 1957] as *C. angustifolia* Wt. However, these specimens differ from *C. macrantha* Wt. in having stems with a single line of patent hairs, petiole with glands at the base and apex, linear sepals, deeply 2-fid corona-scales and corolla with segments cohering at their hard, emarginate tips and from *C. angustifolia* Wt. by broadly ovate and much broader leaves, curved corolla-tube, lanceolate corolla-segments and 5 deeply 2-fid coronal scales.

It may be perhaps, an yet undescribed species from N.W. Himalaya. Please see also *C. macrantha* Wt.

Ceropegia borii Raizada in Ind. For. Rec. (n. s.) Bot. 3(3) : 121-122, t. 1, 1940.

A herbaceous twinner; root of several fleshy, conical tubers. Stems slender, green, tinged with purple. Leaves opposite, distant, up to 12 cm long, 0.5-1.5 cm broad; oblong-lanceolate, acute; margins slightly ciliate, base rounded with an orange-red gland on the upper surface just above the junction of the petiole; petiole short, upto 7 mm long. Flowers usually 1-5, in axillary, umbel late cymes. Peduncle up to 1 cm long, slightly tinged with purple. Calyx gamosepalous, nearly divided to the base. Calyx-lobes 5, linear, acuminate. Corolla pale green, shiny, streaked with pale purple verticle lines below the lobes, about 3 cm long; tube inflated and globose at the base, glabrous within and without, curved and enlarged at the mouth into a large hemispherical head about 1.5 cm in diameter. Lobes 5, almost fleshy at the apex, about 1 cm long, 6 mm wide, connate at the apex, plicate, the inner angles ciliate with spaced long purple hairs, that are continued down some distance with the throat. The inner surface of the lobes at the apex is coloured green, below this there is a purple band, the whole of the green and purple areas being covered with short dense mauve, pubescence. In the bud these purple areas form a ring around the inside of the lobes. After the lobes become separated below the connate apex, the margin assume an undulated outline. The undulate margins are distinctly edged with deep purple and from them emerge spotted hairs, deep purple in colour, 0-7.1 cm long, spreading irregularly, giving the flower a characteristic appearance. Corona double; corolline corona shallowly cup-shaped, the rim bearing 10 equal acuminate lobes,

1.5 mm long; staminal corona a fleshy column attached to the back of the filaments, connate in the centre over the stigma ending above in 5 tails, linear obtuse, 2-3 mm long; between each tail at the base appear the vertical, orange-coloured pollinia sessile on a reddish disk; one in each anther cell (ten in all). Fruit not seen.

Mohan pass, Saharanpur Siwaliks *H.G. Champion*, Dehra Dun Herb. No. 72882; same locality *Raizada*, Dehra Dun Herb. No. 82242.

Fl. Aug.-Sept.

This species is related to *C. hirsuta* W. & A. var. *stenophylla* Hk. f. but can at once be distinguished from it chiefly by the practically glabrous leaves and the characteristic hemispherical head which is fringed with long purple hairs.

McCann (Journ. Bom. Nat. Hist. Soc. 45:211; 1945) reduces this to *Ceropegia longifolia* Wall., a view with which I disagree.

Ceropegia macrantha Wight, Contrib. 31, 1834; Hk. f. in FBI. 4:74, 1883; Raizada in Journ. Ind. Bot. Soc. 14(4) : 160, 1936.

An extensive rather stout nearly glabrous climber. Leaves 7.5-12.5 cm long, very membranous, elliptic-lanceolate, acuminate, shortly petioled; peduncles longer or shorter than the petioles, many flowered. Sepals filiform about 0.7 cm long. Corolla pale, curved, tube narrow, base swollen and forming a long straight beak. Follicles 10-12.5 cm long.

West of Body Guard Lines, *Duthie* 2001; Kaulagarh, Dehra Dun, *H. G. Champion* Dehra Dun Herb. No. 49489; Kheree Ghat, Saharanpur Siwaliks, *Falconer*.

Fl. July-Aug. *Fr.* Sept.-Nov.

Distribution:—Tropical Himalaya from Kumaon to Sikkim.

This species is perhaps referable to and not specifically distinct from *Ceropegia angustifolia* Wt. Contr, 31, 1834; Hk. f. in FBI. 3 : 72, 1882; Raizada in Ind. For. Rec. (n. s.) Botany 4(3) : 68, 1950; However McCann. J.B.N.H.S. 45 (2) : 211, 1945 keeps both species as distinct.

In passing it may be mentioned that Raja Gopal (Proceeding, Ind. Acad. Sc. 35:101, 1965) while dealing with New records for the flora of Allahabad has stated that *Ceropegia bulbosa* Roxb. var. *lushii* Hk. f. (*Fl. Br. Ind.* 4:68, 1883; *Bot. Mag.* t. 3300, 1834) is found in Allahabad (Behind Polytechnical College,

Raja Gopal 3200 & 3200/2). This according to him is characterised by fleshy linear leaves upto 20 cm long & triangular in transverse section & for exceeding the range of variation in leaf length given by Santapau & Irani (Bot. Mem. No. 5, University Bombay 1960) and can be readily identified as *C. bulbosa* Roxb. var. *lushii* Hk. f., which according to Hook. f. (Fl. Br. Ind.) has leaves upto 20 cm in length.

Recently Reddi (Bull. Bot. Surv. Ind. 11(3 & 4) : 431, 1969) has reported the occurrence of *Ceropegia hirsuta* W. & A. (Hk. in Fl. Br. Ind. 4 : 71-72, 1883) a species, which is usually found in the Deccan Peninsula, from the Rihand Dam, Mirzapur Dist., Reddi 1295, 1296. I have not seen his specimens & cannot, therefore, verify the identification.

Cryptostegia grandiflora (Roxb.) R. Br. in Bot. Reg. t. 435, 1819; Merr. Enum. 3:340; 1926; Hk. f. FBI. 4:6 1883; Raizada in Ind. For. Rec. (n. s.) Botany 4(3) : 67, 1950; Backer & Bakh. f. Fl. Java 2:250; 1965; *Nerium grandiflorum* Roxb. (Hort. Beng. 209; 1814, non. nud.) & Fl. Ind. 2:100, 1824.

A large evergreen glabrous shrub or liana, with copious milky juice. Leaves opposite, elliptic or oblong, glossy, 5-10 cm long, 3-5 cm broad, coriaceous. Flowers large pale purple or rose about 5 cm across in terminal di- or trichotomous cymes; bracts cauducous. Calyx glabrous or hoary, cleft nearly to the base; lobes ovate-lanceolate, acute with numerous glands at the base. Corolla funnel-shaped, over 5 cm long, shortly tubular below, throat campanulate. Corona of 5 scales inserted at the base of throat. Stamens with short filaments, anthers adnate to the stigma; pollen-masses granular, in pairs in each cell. Ovary half-inferior, stigma convex. Follicles 10-12.5 cm long, 2.5 mm broad near the base, woody, angled or winged, divaricate; seeds 0.7 cm long, oblong, compressed; coma about 3 cm long.

Naturalized on the Ridge at Delhi, common in sandy beds near Okhla, Delhi, Jaipur, Mathura & Brindaban, Aligarh, Bulandshahr, Agra, Etawah etc.; cultivated in other parts.

Fl. April-Sept. Fr. Oct.-Jan.

Distribution :—A native of Madagascar, cultivated in gardens for its flowers in various parts of India.

Heterostemma alatum Wt. Contrb. 42, 1834; Hk. f. in FBI. 4:47, 1883; Raizada in Journ. Ind. Bot. Soc. 15:160, 1936.

A twining nearly glabrous shrub; branches with two lines of hairs. Leaves opposite, 7.5-15 cm by 3-9 cm, rather coriaceous, light green, elliptic-ovate, oblong or oblong-lanceolate, acuminate, base acute or rounded, rarely cordate, nerves 3-4

pairs winged beneath; petiole 2.5-5 cm. Flowers rather small 1.5-2.2 cm across, yellow, in shortly peduncled umbelled or racemose cymes. Calyx small, 5-fid, or-partite. Corolla rotate, lobes broad, triangular, valvate. Coronal processes ovate-lanceolate, acuminate with a large, ovate, acute concave appendage on the surfaces. Follicles double, divaricate, through nearly three right angles and therefore pointing obliquely upwards, 7.5-12.5 cm long, straight, pointed.

Dehra Dun in ravines, Sept. 1882, Duthie.

Fl. Rainy season. Fr. Cold season.

Distribution :—Central & Eastern Himalaya; Kumaon, Nepal, Sikkim, Khasi Mts.

Hoya longifolia Wall. ex Wight in Wight, Contrb. 36, 1834; Hk. f. in FBI 5:56, 1883; Raizada in Ind. For. Rec. (n.s.) Botany 4(3) : 68, 1950.

A slender creeping under shrub. Leaves 10-21 cm long, narrowly oblanceolate, acuminate, very fleshy; peduncle long or short smooth, reddish, midrib, obscure, base narrow, acute or round; petiole very short upto 2.5 cm. Peduncles sometime up to 5 cm. Sepals ovate, acute, glabrous. Corolla 2.4 cm across; coronal-processes broadly ovate, with a central boss, convex beneath. Follicles 10-15 cm long, slender, straight; seeds small, lanceolate.

Sansaru Khala, Dehra Dun, U.N. Kanjilal s.n. This species just enters our area.

Fl. Rainy season. Fr. cold season.

Distribution :—Temperate Himalaya from Kumaon to Sikkim, Khasi Mountains.

Pentatropis capensis (Linn. f.) Bullock in Kew Bull. 1955: 284, 1955; Santapau & Irani in Bot. Mem. Univ. Bom. 4:69, 1960; *Cynanchum capense* Linn. f. Suppl. 168, 1781; *Pentatropis microphylla* (Roxb.) Wt. & Arn. in Wight, Contr. 52, 1834; Wt. Icon. t. 352, 1841; Dalzell & Gibson Bombay Fl. 149, 1861; Hk. f. in FBI. 4:20 1883; Cooke Fl. Pres. Bombay 154, 1905; Blatter & McCann in Journ. Bom. nat. Hist. Soc. 6(3 & 4): 527, 1934; Gamble, Fl. Pres. Madras 2 pt. 5:587, 1956 (Repr. ed.); Haines Bot. Bih. & Oriss. 2:580, 1961 (Repr. ed.); Prain Bengal Plants 2:572, 1963 (Repr. ed.); *Asclepias microphylla* Roxb. Fl. Ind. 2: 35, 1832.

A twining undershrub; stem suffruticose near the base, terete, branched. Leaves petiolate; petioles 5-8 mm long; lamina 2.5-4 × 1.5-2.5 cm, thick, fleshy, ovate or ovate-oblong subcor-

Tylophora exilis Colbr. in Trans. Linn. Soc. 1:358, t. 16, 1796; Hk. f. in FBI. 4:44, 1883; Raizada in Journ. Ind. Bot. Soc. 14(4): 160, 1935; Backer & Bakh. f. Fl. Java 2:261, 1965.

A slender climber with ovate-oblong or lanceolate, acuminate, glabrous leaves. Peduncles long, slender, flexuous, simple or branched, bearing few-flowered subsessile umbels; pedicels short; sepals ovate, hispid; corolla-lobes short, coronal processes gibbous. Follicles 7.5-13 cm long, long pointed, membranous, glabrous.

Monthronwala, Dehra Dun distr. *Raizada* s.n.

Monthronwala, Dehra Dun, *U.N. Kanjilal* 881; Garjia, Ramnagar division, *A.E. Osmaston* 1189.

Fl. Cold season.

Distribution :—Assam, Silhet; Chittagong-Malacca.

Tylophora indica (Burm. f.) Merr. in Phil. Journ. Sci. 19: 373, 1921; Santapau in Rec. Bot. Surv. Ind. 16(1): 174, 1953; Santapau & Irani in Bot. Mem. Univ. Bomb. 4:88, 1960; P.C. Kanjilal in For. Fl. Uttar Pradesh 457, 1966; *Cynanchum indicum* Burm. f. Fl. Ind. 70, 1768; *Asclepias asihmatica* Linn. f. Suppl. 171, 1781; *Tylophora asihmatica* W. & A. in Wihtg. Contr. 51, 1834; Wt. Icon. 1277, 1848; Hk. f. in FBI. 4: 44, 1883.

A perennial twining much-branched under shrub, with a thin creeping root-stock. Leaves 5-10 cm long, 3-5.5 cm broad, ovate-oblong or elliptic-oblong, acute or apiculate at apex rounded at base, glaucous and glabrous above, pale green and pubescent below when young, at length glabrous with numerous glands at the base of mid-vein on upper side. Flowers yellowish-purple within, in lateral umbellate pubescent cymes. Follicles in pairs, divaricate, 6-7 cm long, 0.7-1 cm broad, lanceolate, sharply pointed.

Bahraich, Gonda, Kheri-Dudhwa *Henderson*, Delhi *Parker*.

Fl. March-Aug. *Fr.* July-Oct.

Distribution :—North and East Bengal, Assam, Cachar, Chittagong, Concan; Ceylon, Siam, Malaya islands, Borneo.

LOGANIACEÆ (BUDDLEJACEÆ)

Buddleja madagascariensis Lamk. Encycl. 1:513, 1785; Bailey, Man, Cult. Pl. 804, 1949.

A large rambling evergreen shrub. Leaves opposite, ovate-oblong, deep green above, deeply white-tomentose beneath. Flowers orange in large terminal panicles.

Often grown in shrubberies for its flowers in the plains.

Fl. Feb.-March.

Distribution :—A native of Madagascar and the Mascarenes.

The correct spelling & adopted in the Code is : *Buddleja* not *Buddleia*.

GENTIANACEÆ

Centarium centaurioides (Roxb.) Rolla Rao et Hemadri in Journ. Bom. Nat. Hist. Soc. 67(2) :357, 1970; *Chironia centauioides* Roxb. (Hort. Beng. 16, 1814, nom. nud.) Fl. Ind. ed. Carey & Wall. 1:585, 1832 (non *Erythraea centauioides* Hort. Gotting ex Griseb. 1839) *Erythraea roxburghii* G. Don, Syst. Gard. 4:206, 1837-38; Hk. f. in FBI. 4:102, 1883; Duthie FUGP. 2:74, 1911; *Centarium roxburghii* (G. Don) Druce in Rep. Bot. Exch. Club Brit. Isles 4:614, 1916; *Erythraea centauioides* Voigt, Hort. Suburb. Cal. 520, 1812, nomen.

An erect annual herb, branched from the base, 3-15 (-20) cm tall. Basal leaves in a rosette, lanceolate-oblong, obtuse, usually perished before flowering, higher ones lanceolate-linear, acute or so, glabrous, somewhat pale beneath, 1-1.5 × 0.2-0.5 cm, uppermost smaller, passing into bracts. Flowers up to 1 cm long, in leafy cymose panicles; calyx 0.5-0.6 cm long, segments linear, shorter than the corolla tube; corolla pink or purple, 1 cm long, lobes lanceolate, obtuse, 0.35-0.4 cm long. Capsule as long as the calyx.

Rispana, Dehra Dun C. R. Babu 35038; common in dry, rice-fields; New Forest, Dehra Dun. H. B. Naithani 6565; Raizada s.n.

Since the oldest, valid name for this plant is *Chironia centauioides* Roxb., therefore Rao & Hemadri (l.c.) proposed the above new combination with it as a basionym.

Centaurium, Hill (1756) should be the correct generic name as *Erythraea* Neck. (Corr. Borkh. Arch. Bot. 1: 30, 1796) is not only a later name, but also rejected for the conservation against *Centaurium* Hill. (Brit. Herb. 62, 1756). (Vide, Taxon 3: 120, 1954). Hence, the hitherto commonly known generic name *Erythraea* should be a synonym of *Centaurium* Hill., which is the correct name for this group of plants. (Vide, Druce in Naturalist 115: 1926; Gilmour in Kew Bull. 1937: 497, 1937; Robyns in Bull. Jard. Bot. Brux. 24: 350, 1954).

BORAGINACEÆ (incl. THRETIACEÆ)

Heliotropium curassavicum Linn. Sp. Pl. 130, 1753; Wright in Dyer, Fl. Cap. 4, 2:7, 1904; Hingorani & Gaur in Ind. For. 91: 293, 1965; Burt in Notes Roy. Bot. Gard. Edinburgh 26: 357, 1965; Curtis Bot. Mag. t. 2669, 1826; Hilliard and Burt in Notes Roy. Bot. Gard. Edinburgh 30: 115, 1970 (Boraginaceae); Maheshwari & Sharma in Bull. Bot. Surv. Ind. 11 (3 & 4): 455, 1962.

A prostrate, villous, halophytic herb up to 25 cm high. Leaves fleshy, entire, less than 2 cm long, glabrous, slightly verrucose. Cymes often branched, up to 4 cm long; peduncle up to 2.2 cm. Calyx glabrous, irregular; lobes linear or triangular. Corolla slightly exserted from the calyx, lobes ovate-triangular, one much longer than the rest; stamens 5, inserted about the middle of corolla-tube; filaments very short, anthers ovoid, acute; ovary 4-lobed, 4-celled; style terminal, short. Nutlets with two small flat and one very large convex seed, slightly rugose on the back.

Pushkar-Merta Road, between the villages Kothi and Talora, Ajmer Dist., V. S. Sharma 1891; along the banks of Jumna River, Delhi, Maheshwari; Raizada s.n.

Fl. Sept.-Dec.

Distribution.—Native of West Indies and tropical America now spread throughout the tropical and subtropical coasts of both Hemispheres, South Africa, Asia. In India well established in South India, Punjab, Rajasthan, Ajmer and Delhi.

Nonnea pulla (Linn.) Lamk. et DC. Fl. Fr. 3: 626, in note; DC. Prodr. 10:32, 1845; Clarke in Hk.f. FBI. 4: 169, 1883; Raizada in Ind. For. Rec. (n.s.) Botany 4(3): 68, 1950; *Lycopsis pulla* Linn. Syst. ed. 10:916, 1859.

A much branched, hispid and villous 18-45 cm herb, usually diffuse. Leaves oblong, upper sub-amplexicaule, lower petioled, alternate. Calyx 5-fid, lobes acuminate, much enlarged in fruit, tube enveloping the nutlets. Corolla blackish-purple, corolla-tube straight, about as long as the calyx, throat naked or hairy; lobes 5, imbricate in bud, obtuse, spreading. Stamens 5, included; anthers oblong, obtuse; ovary deeply 4-lobed; style filiform, stigma shortly 2-lobed. Nutlets 4, ovoid, reticulate rugose, on a depressed-conic receptacle.

Ajmer, Brahma Dutt Tiagi, Dehra Dun Herb. No. 104326, Raizada s.n. In wheat & barley fields.

Fl. & Fr. Feb.-April.

Distribution.—Punjab Plains, W. Asia, Central & E. Europe.

Sericostoma pauciflorum Stocks in Wight, IC. t. 1377, 1848; Clarke in FBI. 4: 175, 1883; Raizada in Journ. Ind. Bot. Soc. 14(4): 161, 1935.

A small straggling strigose under shrub, 15-28 cm high. Leaves variable, alternate, 0.2-8 cm long, clothed on both sides but especially beneath with short rigid bulbous-based hairs. Flowers white about 3 mm across, sessile, solitary, axillary or in a short bracteate raceme. Sepals lanceolate, hispid. Corolla-tube and base of the lobes densely hairy. Nutlets about 2 mm long, ovoid.

Jaipur, *P. Maheshwari* s.n. Abundant & characteristic of sandy soil; used as camel fodder. Also occurs in Ajmer, Raizada; Jaipur. *Parker* Dehra Dun Herb. No. 6830.

Fl. & Fr. Cold season.

Distribution:—Western India, Kathiawar, Sindh.

CONVOLVULACEÆ (incl. CUSCUTACEÆ)

Argyreia bella (Cl.) Raizada in Proc. Nat. Inst. Sc. Ind. 24(4): 200, 1958 & in Ind. For. 93(11): 754, 1967; *Lettsomia bella* Clarke in Hk.f. FBI. 4: 192, 1883; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 480, 1966.

A scandent shrub; branches white-woolly. Leaves ovate-cordate, acute, 10 cm long, glabrous or softly hairy above, white tomentose beneath; petiole 7 cm. Peduncles 1.5-7 cm, rarely exceeding the petioles; flowers capitate, bracts small, spatulate or oblong. Bracts deciduous. Outer sepals gradually smaller, elliptic, densely white hirsute. Corolla hirsute, tubular-campanulate, rose-coloured; capsule 2.5 mm, red, dry when ripe.

Songarah, Nepal border of Gonda, *Sis Ram* (Kanjilal's collector), Dehra Dun Herb. No. 116419; rare.

Flowers Sept.-Dec.

Distribution :—Chota Nagpur.

Argyreia roxburghii Choisy in Men. Soc. Phys. Geneve 6: 425, 1833 & in DC. Prodr. 9: 330, 1845; Clarke in Hk.f. FBI. 4: 185, 1883. var. *ampla* Cl.

A robust climber, stem hairy. Leaves 9.5-18 cm in diameter, broadly ovate or orbicular, acute, softly hairy on both surfaces. Peduncles axillary, 10-20 cm long, appressed-hairy, equalling the petioles; corymbs dense; bracts narrow subpersistent, one or more of the outer bracts often leaf-like. Sepals 0.7-9 cm, elliptic-lanceolate. Corolla 5-10 cm long, funnel-

shaped, red. Ovary 4-celled, ovules 4, style filiform. Fruit depressed, globose, fleshy, orange, 0.2 cm across.

Dehra Dun, *G. A. Gammie* s.n., *R.S. Hole* s.n.; run wild and now naturalized near Dehra Dun i.e. Rajpur, Birpur behind Viceroy's Body Guard Lines etc., *Raizada*; Bindal, Dehra Dun, *C.R. Babu* 33395.

Distribution:—Nepal, Sikkim Terai, Assam.

Argyrea sericea Dalz. in Dalz. & Gibs, Bom. Fl. 169, 1861; Clarke in Hk.f. FBI. 4: 188, 1883; *Raizada* in Journ. Ind. Bot. Soc. 15: 162, 1936; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 477, 1966.

A large silky twiner. Leaves ovate-cordate, acute, hispid above, densely silky beneath, 10 cm long, 6 cm. broad; petiole, 2.5-7 cm. Peduncles 2.5-10 cm; bracts up to 3.5 cm. Sepals unequal, two outer linear-oblong, the inner three lanceolate-acuminate; corolla 6.5 cm., tubular-funnel-shaped, pink, hirsute without. Berry 1.3 cm across, orange-coloured, pulpy.

Rehli, Saugor, *D. O. Witt*; Dudhai, Jamunaiya, Dist. Jhansi, P.C. Kanjilal's Collector; very rare.

Flowers Rainy Season.

Distribution:—Malabar Ghats & Konkan, Belgaum.

Cuscuta capitata Roxb. Fl. Ind. 1: 448, 1820; Clarke in Hk.f. FBI. 4: 227, 1883, Singh in Bull. Bot. Surv. India 6(2-4): 305, 1964.

A slender pale yellow or rose-coloured parasite. Flowers white, capitate. Sepals very small, ovate. Corolla ovoid, covered with minute papillae without, scarcely 0.2 cm; mouth contracted; lobes 5, small, triangular, suberect. Styles linear-lanceolate, as long as the short-linear stigmas. Capsule exceedingly thin and fragile, enclosed by the unchanged corolla, irregularly breaking up from the base, about 1 mm.

Aurangabad, Bulandshahr Dist. *N.P. Singh* 27435; growing as parasite on *Medicago*; Aligarh, *Raizada*.

Fl. & Fr. Apr.-May.

Distribution:—Temperate West Himalaya from Kashmir to Simla-Kabul.

Cuscuta chinensis Lamk. Encycl. Meth. 2:229, 1786; Clarke in Hk.f. FBI. 4:226, 1883; *Raizada & Sharma* in Ind. For. 80 (5): 364, 1962.

A leafless parasite. Pedicles 0-0.2 mm; bracts minute, ovate. Cymes or racemes dense; calyx acutely-lobed, sub-obtuse.

Corolla-lobes 5, ovate, obtuse or shortly acute, scales shortly fimbriate. Ovary and young fruit obtuse, styles 2.

Resembles *C. hyalina*, but with much less elongate, acute corolla-lobes, sepals nearly free, in large examples keeled. In the field *C. chinensis* can be distinguished from *C. hyalina* by its apparently globose white flowers which have sepals tuberculately keeled on the back.

Ajmer Dist.: Happy valley V.S. Sharma 658; Beawar V. S. Sharma 1075; Todgarh. V.S. Sharma 1812; Monthronwala Dehra Dun Raizada s. n.; H.B. Naithani, Ser. II No. 17 & 18.

Fl. & Fr. Most part of the year especially Oct -Nov.

Distribution :—Kashmir & Chamba, E. Bengal, Deccan Peninsula; Ceylon, eastwards to Australia and westwards to Persia.

Cuscuta hyalina Roth Nov. Sp. 100, 1821 (not of Wight); Hk. f. in FBI. 4:226, 1883; Raizada in Ind. For. Rec. (n.s.) Botany 4(3) : 68, 1950.

A leafless parasite. Flowers in cymes or racemes, dense; pedicels very small, bracts minute, ovate. Calyx acutely-lobed about two-third down. Corolla lobes lanceolate, acuminate, 5; scales 0. Ovary and young fruits obtuse, styles 2. Capsule about 1 mm, fragile, irregularly breaking up from the base, narrowly 4-seeded.

Ajmer, Brahma Dutt Tiagi, Dehra Dun Herb. No. 99447, Very common throughout, mostly on *Tribulus terrestris* and *Achyranthes* sp. etc.; R.K. Puram, New Delhi, H. B. Naithani 3217; Shan Nagar, New Delhi, Raizada, on *Achyranthes aspera*.

Fl. & Fr. Rainy & cold season.

Distribution :—Sindh, Deccan Peninsula; Baluchistan, Abyssinea.

Cuscuta santapaui Banerji & Das in Journ. Arnold Arbor. 46 (1) : 86-89, 1965; Vaid & Naithani in Ind. For. 97 (8) : 467, 1971.

A leafless parasite, fairly common in the Doon Valley parasitising on *Duranta repens* Linn. & *Adhatoda vasica* Nees. The marked differences on the basis of which the authors have distinguished this new species from *Cuscuta reflexa* Roxb., are —the reddish stem and dark brown flowers, shallower and more or less urceolate calyx, corolla-tube smaller, infrastaminal appendages being more deeply fimbriate and bearing fimbriae at the bridges, fixation of the anther lobes, and pollen size. The ovary is globose with a distinct style bearing two long and linear

stigmas saccate at the base, and seeds are minute.

According to Vaid & Naithani loc. cit. this species is at once distinguishable from *C. reflexa* in the field, by its stems and flowers being of a reddish-brown colour. This colouration is, however, more pronounced on the plant growing in temperate regions because of cold. Early in the season, the colouration is more of a creamish white tinge and it apparently changes to reddish-brown later, with the approach of cold season.

New Forest, Dehra Dun, Raizada, H.B. Naithani 7455.

Fl. & Fr. Cold season.

Distribution :—East Nepal extending westwards in the Himalaya as far as Kashmir (Pahalgam).

Ipomoea cairica (Linn.) Sweet Hort. Brit. 287, 1827; Ooststr. in Blumea 3:542, 1940 et in Fl. Males. (Ser. 1) 4(4): 478, 1953; Backer & Bakh. f. Fl. Java 2:495, 1965; *Convolvulus cairicus* Linn. Syst. (ed. 10) 922, 1859; *Ipomoea palmata* Forsk. Fl. Aeg.-Arab. 43, 1775; Clarke in Hk. f. FBI. 4:214, 1883; *Ipomoea pulchella* Wight non Roth.

A large glabrous perennial creeper. Leaves palmately cut to the base into 5-lanceolate or ovate-lanceolate, or elliptic segments, the basal pair of segments usually again lobed or parted, 2.5-5 cm long and about as broad. Flowers usually 1-3, in axillary peduncles. Corolla purple, funnel-shaped, 3.5-5 cm long, tube white outside, deep purple inside; capsule subglobose or ovoid, smooth, 2-celled, 2.4-valved, normally 4-seeded.

'The Railway Creeper' is commonly cultivated for ornamental purposes and is naturalized at many places at Rajpur along way side in thickets, over hedges etc. Raizada, Saxena; Hathibarkala, Dehra Dun Raizada; Bindal, Dehra Dun, C. R. Babu 34084.

Fl. & Fr. Throughout the year.

Distribution :—Throughout India, cultivated. A native of tropical Asia and Africa, now pantropic in cultivation.

Ipomoea clarkei Hk. f. in FBI. 4:734, 1885; (in additions et corrections); *Ipomoea stocksii* Clarke in Hk. f. FBI. 4:207, 1880 (per error. pro. *I. clarkei* non *I. stocksii* Cl.)

A slender twiner, resembling generally (when dry) *I. obscura* Ker. Leaves 9 cm, hairy on both sides, deeply cordate, finally acuminate. Pedicles often 3 cm. Sepals cordate, about 1 mm, in flower sub-linear, in fruit lanceolate, sparsely hairy. Corolla fine light yellow, exceeding 2.5 cm, ovoid-oblong, glabrous, 4-valved, 4-seeded.

Goona, Central India, King, vide Prain in Journ. AS. Soc. Beng. 63(2): 105, 1894 under *I. stocksii* Cl.

Distribution:—Malabar & Konkan.

It differs from *I. hispida* R. & S. non Zucc. (= *I. eriocarpa* R. Br.), in the leaves, the seeds and capsule, which latter are hairy in *I. hispida* and glabrous in *I. clarkei*, while it differs from *I. sindica* Stapf in the leaves and seeds.

Ipomoea fistulosa, Mart. ex Choisy in DC. Prodr. 9:349, 1845 (Jan.); Van Ooststroom in Fl. Males. (Ser. 1) 4:509, 1954; Backer & Bakh. f. Fl. Java 2:493, 1965; *Ipomoea crassicaulis* (Benth.) B.L. Robinson in Proc. Amer. Acad. Arts. 51:530, 1916; Ooststroom in Blumea 3:569, 1940 & Fl. Males. (1) 4:599, 1954; Santapau & Patel in Trans. Bose Res. Inst. Calcutta 22:40, 1945; Raizada in Ind. For. Rec. (n.s.) Botany 5 (1): 23, 1950; *Batatas crassicaulis* Benth. Voy. Sulph. 5:134, 1845 (April); *Ipomoea carnea* auct. non Jacq.

A perennial suberect, 1-3 m. tall shrub; stems stout, terete or obtusely subangular, fistular, greyish-green. Leaves 8-18 cm long, 5-7.5 cm broad, ovate or broadly ovate-lanceolate, alternate, entire, acute or acuminate with a mucro at the apex, cordate at the base, midrib with 2 small glands on either side at the base on lower surface; petioles 3.5-6.2 cm long. Cymes many-flowered, axillary and terminal; peduncles 2-9 cm long, thick, terete; petioles 3-10 mm long, terete; bracts about 4 mm by 2 mm, ovate-oblong, caducous, short ciliate along margins, obtuse at apex. Sepals 5, free, alternating with 5 glands at base, outer sepals each 6-7.5 mm by 5-5.7 mm, inner each 7-8.25 by 6.5-7 mm, orbicular, convex, puberulous, minutely ciliate along margins, broadly rounded or sometimes retuse at apex, persistent. Corolla 7-9 cm long, above funnel-shaped, bluish-purple or pale lilac, dark purple towards base within, tube and mid-petaline bands shortly puberulous without, elsewhere glabrous. Stamens 5; filaments unequal in length, inserted near base of corolla-tube, filiform, dilated and hairy at base; anthers 2-celled, oblong, dorsifixed, dehescence longitudinal; pollen spinulose. Disc annular. Ovary 2-celled, 4-ovuled, puberulous or densely pubescent; style, simple, filiform, included, stigma capitate. Capsule 10-16 by 8-10 mm, ovoid, 4-valved or sometimes less, 1.5-2 cm long, oblong, compressed black, covered all over with closely appressed, brown long silky hairs.

Cultivated and now naturalized at many places, in the Upper Gangetic Plain and elsewhere, *Raizada*.

Fl. & Fr. Jan.-Dec.

Distribution :—Native of South America, from Mexico & West Indies, south as far as Brazil, introduced in India as ornamental plant, now running wild in West Bengal, Bombay, Saurashtra, Bihar, Madras, U.P., Punjab, etc., near water-sides of streams and canals.

Incidentally the correct name of *Ipomoea muricata* (Linn.) Jacq. (= *Calonyction muricatum* (Linn.) G. Don), popularly known as Purple Moonflower is *Ipomoea turbinata* Lag. (Gen. Sp. 10, 1816). *Ipomoea muricata* (Linn.) Jack. [Hort. Schoenb 3(2) : 40, t. 323, 1798 (1803)] is a later homonym of *I. muricata* Cavanilles 1799 & hence illegitimate. In this connection see Gunn in Proc. Ass. off. Seed Anal. 59:119, f. 2, 1969 et in Brittonia 24:163, f. 5, 1972 and Oza in Annals Arid Zone 14(1) : 53-56, 1975.

Ipomoea pestigridis Linn. Sp. Pl. 1:2, 1753; var. *capitellata* Clarke in Hk. f. FBI. 4:204, 1883; *I. capitellata* Choisy Convolv. Or. 75. 1884 and in DC. Prodr. 9:363, 1845.

A twinner with ovate-cordate, acute entire leaves.

Hamirpur, U.C. Bhattacharyya 17798.

Fl. & Fr. Sept.-Oct.

The leaves are ovate with irregular lobes (not entire) in Bhattacharyya No. 17798.

Distribution :—Deccan extending north to Bihar according to C B. Clarke.

Ipomoea purpurea (L.) Roth Bot. Abhndl. 27, 1787; Ooststr. in Blumea 3:49, 1940 and in Fl. Males. (Ser. 1) 4:465, 1953; Clarke in Hk. f. FBI. 4:200, 1883; Raizada in Journ. Ind. Bot. Soc. 14(4):162, 1935; *Convolvulus purpureus* Linn. Sp. Pl. (ed. 2) 219, 1762.

A hairy annual climber with broadly ovate-cordate entire leaves rarely 3-lobed with bristly hairs on both surfaces. Flowers on long axillary 1-few-flowered penduncles about 5 cm long with deflexed pedicles, varying in colour from white to pale-blue or purple. Corolla funnel-shaped, 4-6 cm long. Capsule globose, glabrous, about 1 cm in diameter.

Rajpur, Raizada; naturalized in Dehra Dun, Raizada.

Fl. June-Oct. Fr. Sep.-Nov.

Distribution :—Throughout India, ascending to 2100 m. A native of tropical America, cultivated in all warm countries.

Merremia aegyptia (Linn.) Urban, Symb. Antill. 4:505, 1910; Ooststr. in Blumea 3:337, 1939 et Fl. Males. (Ser. 1) 4(4): 448, 1953; Hutchinson, Dalziel & Hepper, Fl. W. Trop. Africa

2:342, 1963; *Ipomoea aegyptia* Linn. Sp. Pl. (ed. 1) : 162, 1753; *Convolvulus pentaphyllus* Linn. Sp. Pl. (ed. 2) 223, 1762; *Ipomoea pentaphylla* Jacq. Collet 2:297, 1762 (non Cav.); Clarke in Hk. f. FBI. 4:202, 1883; *Baiatas pentaphylla* Choisy Mem. Soc. Phys. Cotteve 6:436, 1833; *Merremia pentaphylla* Hallier f. Bot. Jahrb. 16:52, 1893.

Twining hirsute annual. Leaves digitate, leaflets broad lanceolate, sub-sessile, 5-10 cm; petiole 5 cm. Peduncles long, laxly dichotomous 2.5-10 cm; pedicels up to 5 cm, fulvous-hirsute; sepals large, elliptic, outer patently hirsute with brown hairs, enlarged in fruit, up to 2.5 cm; corolla 3 cm wide funnel-shaped, glabrous, white or orchroleoneous. Ovary glabrous, completely 4-celled. Capsule about 1.2 cm, glabrous, ovoid, papery, completely 4-celled. Seeds 4, glabrous.

Bharatpur, Raizada Dehra Dun Herb. No. 64497; Ajmer, A.E. Laurie; Lalitpur, Bundelkhand, Duthie 6995; Old Delhi Fidge. Maheshwari 1269; Pushkar (near Jaipur Ghat), Ajmer V.S. Sharma 720.

Fl. Sept.-Oct. Fr. Nov.-Jan.

Distribution :—West India, Gujarat, Deccan peninsula, Africa, Polynesia, Tropical America; often cultivated.

Merremia dissecta (Jacq.) Hallier. f. Bot. Jahrb. 16:552, 1893 (Sphalm *disecta*); Ooststr. in Blumea 3:328, 1939 et Fl. Males. (Ser. 1) 4(4) : 448, 1953; Backer & Bakh, f. Fl. Java 2: 489, 1965; *Convolvulus dissectus* Jacq. Obs. 2:4, 1767; *Ipomoea sinuata* Ortega, Hort. Matr. Dec. 7:84, 1798; Clarke in Hk. f. FBI. 4:214, 1883; Duthie Fl. UGP. 551, 1960 (Rep. ed.)

An extensive hairy climber with palmately 5-7-partite, nearly glabrous leaves about 7.5 cm in diameter, lobes toothed or subpinnatifid. Peduncles axillary, 1-2-flowered, 5-10 cm long, hirsute; flowers white or pinkish with the throat rose-purple. Sepals nearly 2.5 cm. elliptic-oblong, glabrous; corolla narrowly campanulate, about 3 cm long; capsule about 1.5 cm in diameter, glabrous, 2-celled, narrowly 4-seeded; seeds glabrous or nearly so, black.

Dehra Dun Cantt., Raizada, running wild & almost naturalized; Sohan Lal Dehra Dun Herb. No. 26429; Adarsh Nagar, Ajmer, Brahma Datt Tiagi, Dehra Dun Herb. No. 104325, naturalized along railway line.

Fl. Rainy season. Fr. Oct.-Nov.

Distribution :—A native of tropical America, widely spread in the Old world. Cultivated in gardens in Northern India and occasionally found as an escape.

Rivea laotica Ooststr. in Blumea 8:525-27, f. 1., 1957.

An erect, perennial, suffruticose herb or undershrub, with a woody base. Stem several from the base, simple or branched from the base, terete or angular, densely appressed white-hairy. Leaves orbicular-reniform, with a deeply cordate base, retuse, white margined, glabrous above, appressed white-pubescent on the lower surface, 12-15 × 18-20 (-25) cm; petiole 5-8 cm long, with a pair of glands at apex on the lower side. Flowers white, in 7-10-flowered axillary cymes; peduncle appressed-white pubescent, 10-15 (-20) cm long; bracts caducous; pedicels 0.3-0.5 cm long; calyx-segments nearly equal, ovate-lanceolate or oblong-elliptic-obovate, obtuse, thinly pilose outside, 1-1.5 cm long; corolla 6-7 cm long, glabrous except hairy midpetaline bands, shallowly lobed; stigmas linear; capsule 4-seeded.

Rispana, C.R. Babu 33418. Rare in forest clearings and sal forest; Bindal Nala near Dehra Dun, Raizada.

Fl. Aug.-Oct. Fr. Nov.-Dec.

This species is closely allied to *R. ornata* (Roxb.) Choisy, but is easily recognizable by longer peduncles more-flowered cymes, oblong, obtuse outer calyx-segments. Whereas *R. ornata* (Roxb.) Choisy is characterised by ovate-lanceolate or ovate-oblong and acute calyx-segments, shorter peduncle and few-flowered cymes. It differs also from all the known species of the genus by its erect herbaceous habit, while other species are large woody climbers.

Hitherto known only from Indo-China. It is a new record for India.

R. ornata (Roxb.) Choisy, a species recorded by Duthie in his Flora 2:120, 1911, from Dehra Dun appears to be *R. laotica* Ooststr.

The genus *Rivea* Choisy (1833) is closely allied to *Argyreia* Lour. (1790) sensu lato, but is distinguished by linear stigmas and dry or nearly dry fruit.

Volvolopsis nummularia (Linn.) Roberty in Candollea 14: 28, 1952; Raizada in Ind. For. 9:4453, 1968; *Evolvulus nummularius* (Linn.) Linn. Sp. Pl. ed. 2. 391, 1762; Van Ooststroom in Monogr. Gen. Evolv. 114, 1934 & Fl. Males. Ser. (1) 5:558 f. 3, 1958; Santapau in Journ. Bomb. Nat. Hist. Soc. 47:340, 1947; Stearn in Taxon 21:642, 1979; Raizada in Journ. Ind. Bot. Soc. 15:161, 1936; *Convolvulus nummularis* Linn. Sp. Pl. 157, 1753.

A small branched perennial herb, the stem branched; branches rooting at the nodes, pilose or glabrate. Leaves alter-

nate, exstipulate, shortly petiolated, orbicular or suborbicular, 0.5-1.3 cm across, cordate, rounded at the apex. Peduncles 1-flowered. 1-few in the leaf-axils, much shorter than the leaves. Sepals 5, oblong-lanceolate, hairy on the margin. Corolla white, funnel-shaped, hairy on the margins about 5 mm across. Stamens 5, filaments filiform. Ovary entire, 2-celled; styles 2, free to the base, each deeply cleft; stigma linear-filiform; capsule globose-ovoid, 3-4 mm long, 2-4 valved, 1-4-seeded. Seeds glabrous.

Dehra Dun near Indian Military College Swimming Bath, *Parker*; on the lawn in front of Convocation Hall, Forest Research Institute & Colleges, Dehra Dun *Raizada*, *H.B. Naithani* 3534; Rajpur near 'Sal' forest in open sunny places, *Saxena*, *Raizada*; Benaras, *N K. Tiwary*.

Fl. Sept.-Oct. *Fr.* Oct.-Nov.

Distribution :—A native of West Indies, now naturalized in various parts of United Provinces, Bengal, Orissa, etc.

The genus *Volulopsis* Roberty can easily be distinguished from *Evolvulus* L. in that in the former the leaves are orbicular or suborbicular and cordate at base while in *Evolvulus* the leaves are lanceolate, never cordate at base.

SOLANACEÆ

Brugmansia suaveolens (Humb. & Bonpl. ex Willd.) Bercht. & Presl. Rostl. 1. Solanac. 45, 1823; Van Steenis in Bull. Jard. Bot. Buit. Ser. 3, 11: 17, 1930-31; Backer & Bakh. f. Fl. Java 2:467, 1965; *Datura suaveolens* Humb. & Bonpl. ex Willd. Enum. Hort. Berol. 227, 1809; *Raizada* in Journ. Ind. Bot. Soc. 15:163, 1936, Bor & *Raizada* in Beaut. Ind. climb. & Shrubs 130-131, 1954.

An erect, perennial, shrub-like herb. Stems glabrous or short-hairy. Leaves ovate-oblong or elliptic, obliquely rounded at base, acute or acuminate, entire-repand-sinuate, 10-30 × 4-15 cm long; petiole up to 15 cm long, short-hairy; pedicels 2-5 cm long, up to 10 cm long, in fruiting; calyx glabrous, shortly 5-lobed, glabrous or thinly hairy, 8-15 cm long, lobes ovate-triangular, acuminate; corolla white or light pale yellow, 20-30 cm long, glandular, hairy; lobes with 2.5-3 cm long, acumen; anthers coherent around the style at first, free afterwards. Fruit short-hairy, long-acuminate, 10-15 cm long.

Kaulagarh, Dehra Dun, *Raizada*; Robber's Cave, *C.R. Babu* 33261. Naturalized in wet shady places and water-sides of rivers and streams. Native of Brazil.

Fl. & Fr. Throughout the year.

Most authors, including Safford (Journ. Wash. Acad. Sci. 11:173-189, 1921) & Satina & Avery (Blakeslee, C.S.-The genus *Datura* 18, 1959) treated the genus *Brugmansia* Pers. (1805) as a section of the genus *Datura* Linn. (1753, 1754). However Van Stee is (Bull. Jard. Bot. Buit. Ser. 3, 11: 15-18-, 1930-31) justified the views of Lagerheim (Bot. Jahrb. 20:655-668, 1895) & Van Zijp. (Nat. Tijdsch. Nederl. 80: 24-28, 1920) who maintained *Brugmansia* as a distinct genus. This view has recently been adopted by Backer & Bakhuizen f. Fl. Java 2: 467, 1965.

This species is closely allied to *B. candida* Pers. (*Datura arborea* auct. non Linn. 1753), a native of Peru, but is easily recognizable by shortly-lobed, glabrous calyx and coherent anthers, whereas *B. candida* Pers. is characterized by spathaceous, densely hairy calyx and entirely free anthers.

Cestrum nocturnum Linn. Sp. Pl. 191, 1753; Bailey, Man. Cult. Pl. 874, 1949; Franey in Candollea 7: 67, 1936; Bor & Raizada in Beautiful Ind. Shrubs & Climbers 119, f. 76, t. 45, 1954; Backer & Bakh. f. Fl. Java 2:479, 1965.

A glabrous shrub reaching at height of 3.5 m. Leaves alternate, exstipulate, ovate-oblong to elliptic, shining, tapering at both ends, 10×4 cm, thin. Flowers greenish-yellow, in axillary and terminal, umbelliform racemes. Calyx campanulate with 5 small triangular teeth. Corolla sweet smelling at night, greenish. Stamens 5, alternate with the lobes of the corolla. Ovary glabrous, seated on a fleshy disk, style filiform, stigma capitate. Fruit a blue or blackish berry. Seeds numerous, compressed.

'The Lady of the night' is commonly grown for its flowers which are scented at night.

Fl. Practically throughout the year but most profusely during the rains. *Fr.* cold season.

Distribution:—Indigenous to the West Indies. Largely cultivated throughout the plains of India.

Another species of *Cestrum* viz., *C. diurnum* Linn. is frequently cultivated in gardens throughout the plains of Uttar Pradesh & often spreads itself under garden conditions & will probably soon get naturalised. It is native of West Indies.

Datura innoxia Mill. Gard. Dict. ed. 8 n.5, 1768; Safford in Ann. Rep. Smithson. Inst. 1920: 549-500, ff 3(2) & 4-5 & t. 2; Santapau Fl. Khandala 174-175, 1967; *D. metel* Sims in Curtis Bot. Mag. t.1440, 1812; R.K. Jain in Curr. Sci. 27(10):394, 1958; *Datura metel* auct. (non Linn. 1753); Hk.f. in FBI. 4: 243, 1883; Duthie Flora UGP 2: 131, 1911.

Lucknow Dist. common near habitation and in wastelands near water. Also naturalised near habitations in many parts of the plains of Uttar Pradesh.

It can be easily distinguished from other sp. of *Datura* [*D. metel* Linn. (*D. fastuosa* Linn. or *D. alba* Nees)] by the presence of greyish tomentum on the whole plant; 10-toothed corolla, and long slender spines on the capsule that dehisces irregularly.

This species has wrongly been mentioned as *D. metel* L. in most of the Indian Floras including Duthie (Santapau, Journ. Bom. Nat. Hist. Soc. 47:659, 1948).

This is an American plant, introduced into India & passing till recently under the name of *D. metel* Linn.

***Lycopersicon* Mill.**

The Tomato, *Lycopersicon esculentum* Mill. (Gard. Dict. (ed. 8) n. 2, 1768) as mentioned by Duttie 2:132, 1911, is extensively cultivated in the plains & hills throughout the region of the Upper Gangetic Plains & India. It is frequently found as an escape & occasionally wild in ravines along the stream beds & village streets, but the fruits on such plants are fairly small, the plant produces large numbers of flowers but relatively few fruits, probably due to insufficient pollination in nature.

The correct name of this laxon is *Lycopersicon lycopersicum* (Linn.) Karsten, Deutsch. Fl. 966, 1880-1883. In this connection vide W. F. Wight in Contr. U S. Nat. Herb. 9: 312, 1905 & Backer & Bakh. f. Fl. Java 2:477, 1965.

As the specific epithet does not exactly repeat the generic name it must not be considered a tautonym (Art. 23 of this Code).

The original spelling used by Miller (loc. cit.) is *Lycopersicon* not *Lycopersicum*.

The plant is a native of tropical America.

Nicandra physaloides (Linn.) Gaertn. Fruct. 2: 237, t. 141, f. 2, 1791; Clarke in Hk.f. FBI. 4: 240, 1883; Raizada in Journ. Ind. Bot. Soc. 35: 163, 1936; *Atropa physaloides* Linn. Sp. Pl. 181, 1753.

An annual erect glabrous herb up to 90 cm. high. Leaves stalked, ovate-lanceolate, 10-20 cm long, irregularly sinuately lobed and toothed. Flowers blue, 2.5-3.5 across, single and recurved, usually on axillary stalks. Calyx lobed nearly to the base; segments ovate, cordate, acute. Corolla bell-shaped, limb spreading, 5-lobed. Filaments hairy, base dilated, covering the ovary; ovary 5-celled; style linear, stigma 5-lobed, lobes

cohering. Berry globose about 1.5 cm across, loosely enclosed by the enlarged, membranous, net-veined, 5-angled calyx.

Sahasradhara, Dehra Dun, *Raizada* Dehra Dun Herb. No. 53818; Rispana, Dehra Dun, *C.R. Babu* 35023.

Fl. & Fr. Feb.-March.

Distribution :—Temperate Himalaya from Kashmir to Sikkim, introduced, Mts. of Deccan, introduced. Native of Peru, widely cultivated.

Nicotiana plumbaginifolia Viv. Elench. Pl. Hort. Dinagro, 26, t. 5, 1802; Hk. f. in FBI. 4:246, 1883; *Raizada* in Journ. Ind. Bot. Soc. 35:163, 1935; Goodspeed et al. in Chron. Bot. 16 (1/6) : 403, 1954.

An erect branched herb, up to 75 cm high, viciidly pubescent all over. Leaves 7.5-18 cm \times 3-14 cm, radical larger than the cauline, sessile, elliptic-oblong, entire, usually wavy, acute, base narrowed, sub-amplexicaule; cymes elongate; flowers greenish or pinkish-white; pedicels up to 2 cm; calyx about 1.4 cm long, cleft to the middle; corolla 3-4 cm long; tube long and narrow, lobes small, only 10 mm. Capsule 2 \times 0.8 cm, ovoid-conical, valves again splitting. Seeds minutely rugose.

Dehra Dun, *Raizada*; New Forest, Dehra Dun, *H.B. Naithani* 3599; Roshanara Gardens, Delhi, *J. K. Maheshwari* 97; Gomti river bank, near Central Drug Research Institute, Lucknow, *Patel* 229; *Arora* 221.

A common introduced weed, native of Mexico and the West Indies. It first came to Bengal probably during 1824-1845 (*J.G. Srivastava* in Journ. Ind. Bot. Soc. 43:102, 112, 1965), but has now spread all over Northern India from Assam to Punjab and Delhi. It is a weed of waste places in Dehra Dun. It is common at Okhla and near Jamuna Bridge, Delhi.

Fl. April-June. *Fr.* May-June.

Physalis angulata Linn. Sp. Pl. 183, 1753; Water-fall in Rhodora 60:162, 1958; Gleason, New Britt. & Brown III. Fl. N.E.U.S. & Canada 3, 1963; Backer & Bakh. f. Fl. Java 2:468, 1965; *P. longifolia* auct. non Nutt. 1837; Sant. et. al. in Journ. Bomb. Nat. Hist. Soc. 58:551, 1961.

An erect, widely branched, often much-branched, annual herb, 20-100 cm tall. Stems prominently angular-ribbed, glabrous except crispy short-hairy young parts, often decumbent and rooting below. Leaves ovate-elliptic, with a cuneate or rounded base, oblique, long-acuminate, glabrous, coarsely irregularly sinuate-dentate-incised, 3-10 \times 3-6 cm; petiole 1-5 cm long. Flowers solitary, terminal, seemingly axillary, nodding.

glabrous, 1-1.5 cm long, up to 3 cm long in fruiting; calyx 0.4-0.5 cm long, divided halfway down, glabrous, segments ovate-triangular, acuminate or acute, ciliate, 0.3 cm long; corolla yellow, with 5 small often faint, brown spots inside. 0.8-1 cm long, glabrous, lobes ovate, subacute, ciliate: filaments uniform, not dilated upwards; anthers violet or pale blue, 0.25 cm long. Fruit greenish-yellow, 1-1.5 cm across; seeds granulate, 0.13×0.13 cm; fruiting calyx about 4 cm long, 5-angled.

Dehra Dun, *Raizada*; Rispana, C.R. Babu 32068a; Bindal, C.R. Babu 32068.

Naturalized in waste places, fields, roadsides and gardens; native of America.

Santapau et al (loc. cit.) first recorded this for India from Bombay, under the erroneous name *P. longifolia* Nutt. which is also an American species, but is easily distinguishable from this by perennial habit, upwardly dilated filaments, longer corolla and hairy stems, leaves and pedicel; *P. angulata* Linn. can be distinguished from *P. longifolia* Nutt. by annual habit, slender and not dilated filaments, nearly glabrous stems, leaves, pedicels, smaller flowers and coarsely sinuate-dentate leaves.

This is the first report for the Upper Gangetic Plain and for the whole of India as *P. angulata* Linn.

Physalis heterophylla Nees in Linnaea 6:463 1831; Waterfall in Rhodora 60:140, 1958; Gleason, New Britt. & Brown, Ill. Fl. N.E.U.S. & Canada 3:197, 1963.

An erect or decumbent-ascending, somewhat viscid, glandular-villous, annual, perennial herb. Stems angular-ribbed, patent-glandular-pubescent, often rooting below. Leaves ovate-elliptic, with an often unequal, cuneate or rounded or sub-cordate base, acute or acuminate, glabrous except hairy nerves beneath, or appressed-hairy, $2.5-7 \times 2-6$ cm; petiole 3-7 cm long patently glandular-pubescent. Pedicels 0.5-7 cm long, 1.5-2 cm long in fruiting, patent-hairy; calyx 0.4 cm long, divided less than halfway, glandular-hairy, lobes ovate-triangular, sharply acute; corolla yellow, with 5 large brown spots, 1 cm long; filaments 0.6 cm long, dilated upwards, hairy in the lower part; anthers violet. Berry ellipsoid, yellow; fruiting calyx 5-angular, nearly glabrous, 2-2.5 cm long.

Robber's Cave, Dehra Dun *Raizada*, C.R. Babu 32100, 33847.

Naturalized in waste places and sandy river-beds; native to North America.

This is the first report of its occurrence in India, and possibly in Asia.

Physalis micrantha Linn. Enum. Hort. Berol. 1:181, 1821; Heine in Fl. West Trop. Afr. ed. 2. 2:329, 1963.

An erect, simple or branched, annual herb, 15-45 cm high. Stems angular-ribbed, nearly glabrous. Leaves ovate, with a rounded or cuneate base, acute or acuminate, entire-sinuate-dentate, glabrous, 1.5-6 × 1.5-4 cm; petioles 0.5-5 cm long. Flowers solitary, terminal, seemingly axillary, nodding; pedicels short-hairy, 0.5-0.6 cm long during anthesis up to 1 cm long afterwards; calyx hairy, 0.4 cm long, lobes triangular, acute; corolla pale yellow, 0.4-0.5 cm long; filaments hairy at the base, anthers yellow. Fruiting calyx glabrous, 2-3.5 cm long.

Rispana, Dehra Dun, *Raizada*, C.R. Babu 32277. Common in fields, waste places and road-sides.

Fl. & Fr. July-Nov.

It is very closely allied to *P. minima* Linn., with which it was associated in several floras, but is easily recognizable by glabrous stems and leaves, shorter pedicels and smaller flowers and fruiting calyx not being prominently 5-angled.

Hitherto not recorded for India.

Physalis peruviana Linn. Sp. Pl. (ed. 2) 1670, 1763; Clarke in Hk. f. FBI. 4:238, 1883; Waterfall in Rhodora 60:141, 1958; Backer & Bakh. f. Fl. Java 2:468, 1965.

An erect or rambling perennial herb. Leaves ovate, sinuate, angular or scarcely lobed. Flowers axillary, solitary nodding. Calyx campanulate, 5-fid half-way down, in fruit campanulate, greatly enlarged in fruit and loosely enclosing the fruit, villous or pubescent. Corolla yellow, campanulate with 5 large spots near the base within about 1.4 cm; stamens 5; ovary 2-celled, style linear, stigma obscurely 2-lobed. Berry globose, about 2 cm across, yellow when ripe; fruiting calyx 5-angled, 4-5 cm long.

Lucknow on the banks of Gomti, *Raizada*; Rispana, Dehra Dun, C. R. Babu 32276; above left bank of the Gomti, near Haidarabad, Lucknow, *Patel* 1219. Common in sugar-cane fields.

Fl. & Fr. Cold season (greater part of the year).

Distribution.—The Cape Gooseberry, is cultivated throughout India and is now occasionally met with as escape and is getting naturalized. Indigenous to tropical America, extensively cultivated in the Old world.

Solanum elaeagnifolium Cav. Ic. 3: 22, t. 243, 1794; Maheshwari & Singh in Plant Science 2: 75, 79, 1970 figs 1-8; R. R.

Rao & B. A. Razi in Curr. Sc. 43(22): 734, 1974; Gleason, The New Britton & Brown Illus. Fl. Pacific States 3: 202, 1952; Steyermark in Ann. Miss. Bot. Gard. 22: 636, 1936 & Fl. Missouri 1313, 1963; Naithani & Raizada in Ind. For. (in press).

An erect, perennial, silvery-canescant, prickly herb. Stems often woody at base, 30-80 cm high; prickles straight, yellow, sometimes copious or lacking on the branches. Leaves alternate, oblong or elliptic to lanceolate $6-12 \times 1.5-3$ cm, entire or repand, stellate-hairy but more densely beneath, prickly along midrib and strongly petioled. Flowers pale violet or violet blue, in extra-axillary, umbellate cymes; calyx campanulate or cupular, 3-4 mm long, stellate-hairy, 5-lobed; lobes linear, subulate, upto 1 cm long. Corolla 2.3 cm across, stellate-pubescent outside, with yellow vein in centre. Stamens 5, filaments 2.4 mm; anthers connivent, 6-8 mm long. Ovary white-tomentose; style 2.4 mm long, hairy, stigma terminal, simple, capitate. Berries globose, 7-12 mm across, yellow when ripe, with persistent calyx at base, which is sometimes reflexed. Seeds hemispheric or ovoid, $3-4 \times 2-3$ mm, slightly biconvex or flattened, greyish black or dark brown, lenticular.

Chattar Manzil, C. D. R. I., Lucknow, V. Singh 80328 (Lwg); Company Garden, near Hussainabad, Lucknow, Bhagwandin 42366 (Lwg); Delhi, R. Bedi, Dehra Dun Herb. No. 147560.

Fl. & Fr. July-Oct.

Distribution:—Delhi, Uttar Pradesh, Tamil Nadu, Maharashtra and Karnataka, Pakistan, Europe and America.

It is a native of Mexico and Central American States. The berries are rich in glycoalkaloids and contain as much as 3.2 per cent 'solasodine', which can be used for the manufacture of various steroidal hormones. The species, therefore, turns out to be a useful plant for the production of steroidal hormones and can be raised as a potential drug crop (Maiti & Mathew Curr. Sc. 36: 126, 1967).

The nearest species among the South Indian *Solanums* with which it can be compared is *S. wightii* Nees which is found in the Nilghery Mts.; the two can, however, be readily separated by the following key.

Leaves ovate, cordate, softly tawny pubescent on both surfaces; corolla more than 5 cm across; stamens unequal.....

S. wightii

Leaves linear-lanceolate to narrowly oblong, grey canescent on both surfaces as are the other parts; corolla less than 2.5 cm across, stamens equal.....*S. elaeagnifolium*

Recently Vartak (Journ. Bom. Nat. Hist. Soc. 54 (4): 965, 1957) reported the occurrence of *Solanum esuriale* Lindl., a native of Australia from Poona. I have examined Vartak's specimen 2735 which is available in Dehra Dun Herbarium and quoted by him under this species and have carefully gone through his description which exactly tallies with *Solanum elaeagnifolium* Cav. I have, therefore, no hesitation in referring Vartak's *Solanum esuriale* Lindl. which is definitely a case of misidentification to *Solanum elaeagnifolium* Cav.

Solanum hispidum Pers. Syn. 1: 228, 1805; Dunal in DC. Prodr. 13(1): 275, 1852; Standley in Contrib. U.S. Nat. Herb. 23: 1300, 1924; Raizada in Journ. Ind. Bot. Soc. 35: 162, 1936; White in Kew Bull. 1959: 666-668, 1940.

A prickly shrub, 1.5-2.5 m high, ferruginous-tomentose all over. Leaves ovate or elliptic, sinuate or lobed, with a few prickles on the mid-rib below. Flowers in dense extra-axillary cymes. Corolla white, 2-2.5 cm across. Berries green, globose, 7.8 cm in diameter.

Naturalized in ravines in Dehra Dun, Raizada, Saxena; New Forest, Dehra Dun, H.B. Naithani 3561.

Fl. Dec.-Sept. Fr. Most part of the year.

Distribution:—A native of Peru, naturalized in the hilly parts of North West India.

Solanum pseudocapsicum Linn. Sp. Pl. 184, 1753; Gupta in For. Fl. Chakrata, Dehra Dun and Saharanpur Forest Divisions, 351. 1928; Bor & Raizada in Beaut. Ind. Clim. & Shrubs, 123-124, f. 78, 1954.

A low erect undershrub 60-90 cm high with spreading branches. Leaves 5-12.5 cm long, oblanceolate or oblong, entire or repand, bright green and shining, attenuate at the base into a short petiole. Flowers extra-axillary, solitary or in few-flowered, umbellate cymes. Corolla rotate, 5-parted, white or purple. Berries globose, 1.4 cm across, bright red when ripe.

Dehra Dun, Raizada, Gupta; naturalized in various parts of Dehra Dun and Mussoorie (Kulri, Mall Road etc. Saxena 696, 885; Parkinson 69).

Fl. Aug. Fr. May.

Distribution:—Native country uncertain, probably native of the Old World. Widely distributed in tropical and sub-tropical regions; cultivated in various parts of India.

Solanum purpureilineatum Sabnis et Bhatt, in Bull. Bot. Surv. Ind. 12 (1-4): 258-260, 1970 (with plate).

Erect or decumbent herb, 25-40 cm high sparingly branched from the base, without basal rosettes. Stems green with purple tinge, nodular, hard, pubescent at base. Branching crowded. Leaf-blades ovate, truncate, merging into the petiole, irregularly dentate with 2-4 teeth on each side, sparingly hairy on both surfaces more hairy on the veins and margins. Inflorescence a corymbose, cyme, extra axillary, few flowered, pedunculate. Peduncles 7-10 mm long, at an angle of 40-100°. Pedicels slightly pubescent, 4-5 mm long, at an angle of 40-50°. Flowers regular, bisexual complete. Calyx 1.2-1.5 mm long, gamosepalous, pubescent, deeply lobed; lobes 0.5 mm long and 0.7 mm wide, oblong with rounded apices and a purple spot in between. Corolla 4.5-5 mm long, 7-8 mm wide, gamopetalous, rotate with a yellowish-green star, distinctly lobed; lobes 2.5-3 mm long, with a dark purple median stripe, often with two short, lateral ones on either side or the median at base; the stripes more prominent on the outer surface of the corolla lobes. Corolla lobes 5 (rarely only four). Stamens 5, 2.6-3 mm long, epipetalous, closely placed and forming a column; anthers 1.6-1.8 mm long, yellow, notched at the apex; filaments 1.6-1.8 mm long, dilated at base, covered with long, flexuous, glistening hairs throughout within. Ovary 1-1.2 mm long, subglobose; style 3-3.2 mm, straight or slightly bent at the tip, little exceeding the anther column, pubescent upto $\frac{2}{3}$ its length; stigma globose, capitate. Berries 6-6.5 mm in diameter, soft in texture, globose, shining green becoming orange-red at maturity, with a persistent, reflexed calyx. Seeds 2 mm in diameter, pale-coloured, 25-32, with 2 or 3 stone grains per berry, these engulfed in a mucilaginous pulp.

Chromosome number : $2n=48$.

Near G.P.O., Dehra Dun, H.B. Naithani Ser. II. No. 213 collected on 15.6.1974.

Fl. & Fr. Sept.-March.

Distribution :—Baroda as a rare weed in garden and roadsides and in cultivated fields, river banks & waste places in some localities in North and Central Gujarat. I have not seen the type of the species which was collected by Sabnis (2762, 2763) from L.V. Palace Compound, Baroda on 2.10.1960.

This species is very near *Solanum nigrum* Linn. and in my opinion hardly distinct from it.

Dr. S.J. Bedi, Deptt. of Botany, Faculty of Science, M.S. University of Baroda informed the author in a private communication "I have also collected *Solanum purpureolineatum* Sabnis & Bhatt from Dehra Dun and certain other localities in Northern India".

Solanum sisymbriifolium Lamk. Illustr. 2:25, 1793; Backer & Bakh. f. Fl. Java 2:472, 1965; Sahni & Naithani in Acta Botanica Indica 2:151-153, 1974. *S. balbisii* Dunn. Hist. Solan. 232, t. 3, 1813.

A villous, viscous prickly, woody undershrub, 45-90 cm tall with simple gland-tipped hairs; prickles long, straight, slender, sinuate, yellow or reddish-yellow. Leaves oblong, pinnatifid or 2-pinnatifid, prickly, up to 20 cm long, 10 cm broad; indumentum softly stellate-pubescent; lobes acute, sinuate-dentate, lateral nerves 4-5 pairs, prominent, beset with long hairs and armed on both surfaces. Peduncles extra-axillary and terminal, many-flowered. Flowers white or light violet. Calyx 5-partite, tube inflated in fruit, deeply cup-shaped, ultimately reflexed; lobes lanceolate acute, sparingly armed. Corolla 2.5 cm across, slightly hirsute externally, white or violet. Berry 1.5 cm across, subglobose, glabrous, dark red, edible. Seeds orbicular to ovate, pitted, 2-2.5 mm in diameter.

Rishikesh, District Dehra Dun, N.B. Naithani 3232, 3546, 3547, 3637.

Distribution :—Lower Bengal, Nilgiris, Shillong.

This species is a native of tropical America, naturalized on wastelands, river beds and road-sides in Rishikesh, Uttar Pradesh. Probably the seeds and/or fruits were inadvertently carried by pilgrims from South or East India as Rishikesh is a place of pilgrimage.

Prain (Journ. As. Soc. Beng. 65:542, 1896) first reported it from Lower Bengal, subsequently Prain (Bengal Plants 2:746, 1903). Gamble (Flora Pres. Madras 2(4): 935, 1921), Fyson (Flora S. India Hill Stations 1:429, 1932) and Kanjilal et al (Flora Assam 2(4): 271, 1939) have also reported this plant in their respective floras.

Solanum torvum Swartz, Prod. 47, 1788; Clarke in Hk.f. FBI. 4: 234, 1883; Raizada in Journ. Ind. Bot. Soc. 35: 162, 1936; Backer & Bakh. f. Fl. Java 2: 475, 1965; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 492, 1966.

A large much branched, tomentose shrub upto 4 m tall; young parts all densely fulvous tomentose. Leaves 4-15 × 2-11 cm, ovate or ovate-oblong, sinuately lobed, obtuse or acute at apex, truncate or unequal sided at base, sparingly tomentose above, densely tomentose beneath. Flowers white with a yellowish base, in many-flowered corymbose cymes. Berries 1.5 cm across, globose, glabrous, dark green turning yellow. Seeds subreniform, brown.

Common in ravines near Dehra Dun, Raizada; New Forest

Dehra Dun, H.B. Naithani 3560. Also naturalised in damp localities in the district of Pilibhet, Kheri, Gonda, Gorakhpur etc.

Fl. & Fr. Dec.-March.

Distribution.—Throughout India in the tropical region, except the Western desert area, Bengal; Malaya, China, Philippines, tropical America.

Solanum triquetrum Cav. Syn. Fl. North Am. 2 : Part 1, 2nd ed. 228-229, 1886; Wazahat Hussain in Bull. Bot. Soc. Bengal 22(2) : 237-238, 1968.

An erect herb, 45-75 cm tall, sometimes procumbent or slightly climbing depending upon the availability of support. Stem herbaceous with woody root stock, older branches brown; suffrutescent, flexuous. Leaves simple, alternate, petiolate; petiole 1-1.5 cm long; lamina with much variation in shape and size, usually deltoid-ovate with a tendency to become hastate, 3-lobed; lateral lobes 1.5-2 cm long, 0.8-1 cm broad with two distinct veins, the middle lobe 3.5-4.5 cm long and 0.8-1 cm broad, lanceolate or linear with umbellate tendency. Flowers pedicellate, pedicel clavate, nodose-articulated at the base, ebracteate, regular, bisexual. Calyx of 5 sepals, gamosepalous, 2.5-3 mm long and 1-1.5 mm broad, green but slightly pinkish at the margin, apex and margin distinctly hairy. Corolla white, 5-lobed, each lobe 0.7-0.8 mm long, 0.3-0.35 mm broad, usually sometimes slightly purple, prominently hairy all along the margin and apex; hairs multi-cellular. Stamens, epipetalous; filaments short, 1.5 mm long; anthers 3-3.5 mm long and 1 mm broad, deep yellow, bilobed with porous dehiscence. Ovary 2-celled globose, 1 mm long and 0.8 mm broad, with axile placentation; style one, filiform, 7-8 mm long; stigma slightly capitate. Fruit a berry, globose, 0.75-0.8 mm in diameter, changing to yellow and then orange during ripening. Seeds many, 3 mm long, 2 mm broad, minutely muricate.

According to Wazahat Hussain this species is found under the partial shade of *Capparis sepieria* L. Atrauli Road, Aligarh, November 1963, Hussain 803, 804, and 805. Saharanpur Garden, Dehra Dun Herb. No. 1757.

Fl. September to February. Fr. Oct.-March.

Solanum viarum Dunal in DC. Prodr. 13: 240, 1852; Babu in Journ. Bom. Nat. Hist. Soc. 67(3): 609-11, 1970/71; *Solanum khasianum* Cl. var. *chatterjeeanum* Sen Gupta in Bull. Bot. Surv. Ind. 3: 412-415, 1961; Naresh Bahadur & Ram Dayal in Ind. For. 94: 186, 1968.

An erect or diffuse prickly shrub up to 1 m high; prickles of two types-smaller ones up to 5 mm long, compressed, disin-

ctly recurved, the longer ones up to 15 mm long and straight. Leaves broadly ovate-cordate, lobed, sparsely prickly on both sides. Flowers in 3-5-flowered, lateral, glandular pubescent corymbose cymes, 1.5-2 cm across. Calyx-lobes ovate, acute up to 4 mm long and 2 mm broad, glandular pubescent. Corolla white, 1-1.2 mm long. Berry pale-yellow, streaked with green, globose up to 4 cm in diameter; fruiting pedicel stout aculeate or prickly. Seeds compressed, sub-orbicular, minutely muricate or granulate.

Dehra Dun Cantt. *Raizada*; Bindal, Dehra Dun, C.R. Babu 34694; *Saxena* 251, 1979; Doma, Gorakhpur, *Panigrahi* Dehra Dun Herb. No. 142474.

Fl. & Fr. Jan.-Dec.

Distribution:—Native of Brazil; probably introduced into India accidentally during World War II. Now naturalized in waste places, road sides and fields in Dehra Dun; also naturalized in Assam, W. Bengal, Bihar & Orissa, Sikkim, Tamil Nadu and Uttar Pradesh.

Of late this plant has come into prominence as the alkaloid 'Solosodine' is found fairly in good percentage in its fruits. Sen Gupta (loc. cit.) erroneously described it as var. *chatterjeeanum* under *Solanum khasianum* Clarke which is a quite different and distinct plant of probably S. American origin. A careful study of the type of *S. khasianum* var. *chatterjeeanum*, as well as the description of *S. viarum* Dunal shows beyond doubt that the former is conspecific with the latter, and should be the correct name for this S. American alien.

The identity of *S. viarum* Dunal was confirmed by Mr. C. V. Morton of Smithsonian Institution, Washington, DC. Recently Thothahri (Ind. For. 101(3): 179) has reported the occurrence of this species, *Solanum khasianum* Cl. var. *chatterjeeanum* Sen Gupta in Baratang Island which lies more or less between South & Middle Andaman and constitutes a new record for Andaman & Nicobar. He further says that it is conspecific with *Solanum myriacanthum* Dunal (Dunal Hist. Solan. 218, t. 19, 1813 et. DC. Prodr. 13: 243, 1850) which probably is a native of Mexico & Brazil and according to Ind. Kewensis is synonymous with *S. aculeatissimum* Jack. I am, however, unable to verify whether these two species are the same as *S. viarum* Dunal.

Withania coagulans (Stocks) Dunal, in DC. Prodr. 13: 1: 685, 1852; Hk.f. in FBI. 4: 240, 1883; *Raizada & Sharma* in Ind. For. 88(5): 365, 1962; *Puneerea coagulans* Stocks in Jr. As. Soc. Bomb. 3: 54-57, 1849.

An ashy-grey undershrub .5-1 m high. Stem densely clothed with stellate grey tomentum. Leaves 1.8 × 5.3 cm, elliptic-lanceolate to oblanceolate, linear to narrowly lanceolate, acute, attenuate at base. Flowers dioecious, axillary on filiform 1-2 cm long bracteate pedicles deflexed laterally. Corolla about 1 cm long, often the tips of petals tinged purple. Capsule ovoid, acuminate or beaked at apex, pubescent, pale-brown, obscurely veined, extruding from the persistent calyx.

Lohargal Road, Ajmer Dist. V.S. Sharma, 206.

Fl. & Fr. Feb.-March.

Distribution:—Punjab & Sindh, Sutlej Valley; Kabul and Baluchistan.

SCROPHULARIACEÆ

Alectra parasitica A. Rich. var. *chitrakutensis* M.A. Rau in Bull. Bot. Surv. India 3(1): 25-26, 1961.

A root parasite, changing black on drying. Stems rhizomatous, perennating, underground parts of stem strongly developed, 2-3 cm thick, horizontally extending with numerous axillary buds in the axils of closely set scale leaves. Rhizome orange-yellow with a stale odour, shrinking considerably on drying. Inflorescence terminal on the rhizome, flower bearing portion of erect axis 5-20 cm long, angular, purplish, hispid. Leaves very small, mostly scale-like, hispid, largest 0.6 cm long, linear oblong, obtuse. Racemes rather loose; floral leaves or bracts linear as long or longer than the sessile or almost sessile flowers. Bracteoles very slender as long as calyx-tube in open flower, persistent. Calyx campanulate, hairy outside, lobes shorter than tube, deltoid, acute. Corolla about 1 cm, glabrous, yellow with purple streaks. Filaments short, glabrous; anther cells slightly unequal, obtuse. Ovary globose, style long, inflexed. Capsule globose, 0.5 cm across, splitting into 4-valves. Seeds many, minute, cuneiform.

Chitrakut, Banda dist., *M.A. Rau 3724*, apparently parasitic on the roots of *Vitex negundo* L.

Fl. & Fr. Sept.-Nov.

Distribution:—So far known from Chitrakut, Banda dist., Uttar Pradesh.

Alectra sessiliflora (Vahl) Kuntz. var. *monticola* (Engl.) Melch. in Notizbl. Bot. Garten, Berlin 15: 126, 1940 and loc. cit. 15: 438, 1941. *Melasma indicum* (Benth.) Wettst. var. *monticolum* Engl. in Engl., Bot. Jahrb. 30: 402, 1901; *Alectra indica* sensu Hk.f. in FBI. 4: 297, 1884; *Melasma avenae* (Benth.)

Hand.-Mazz., Symb. Sinicae pt. 7: 543, 1936; Backer & Bakh.f. Fl. Java 2: 513, 1965.

A rigid, annual, hairy, hemiparasitic herb, drying black. Leaves opposite or upper ones spirally arranged, sessile or on short petioles, entire, dentate, or deeply incised, ovate-oblong, with cuneate-rounded-cordate base, sparsely pilose, the lower ones 2-4 cm \times 1-2 cm, upper ones small. Flowers sessile or nearly so, in erect, 5-15 cm long spikes, shorter than bracts; bracteoles ciliate; calyx ovoid-campanulate, angular, pilose, afterwards inflated, 5-lobed, during anthesis 3-4 mm long. Corolla yellow, 5-7 mm long, tube campanulate, lobes 5, patent, broad, subequal, the two posterior ones in bud mostly inside. Stamens 4, included, didynamous or subequal; anthers 2-celled; anther cells parallel; stigma thickened or tongue-shaped, entire or shortly 2-lobed. Capsule shorter than calyx, subglobose, 4-lobed, enclosed within calyx, loculici dally 2-valved; valves entire or at last 2-fid. Seeds numerous.

Sahasradhara, S. K. Malhotra 23905. A herb, flowers yellow.

Fl. & Fr. Oct.-Nov.

Melasma avene (Benth.) Hand.-Mazz, differs from *Melasma thompsoni* (Hk.f.) Wettst. (*Alectra thompsoni* Hk.f.) by its ovate-lanceolate, toothed leaves and sessile flowers.

Anticharis senegalensis (Walp.) Bhandari in Bull. Bot. Surv. Ind. 6(2-4): 317, 1960. *Anticharis linearis* (Benth.) Hochst. ex Aschers in Monatsb. Akad. Wiss. Berl. 882, 1866; Hk.f. in FBI. 4:250, 1883; Raizada & Sharma in Ind. For. 88 (5): 365, 1962; *Doratenthera linearis* Benth. in DC. Prodr. 10: 347, 1846. *Doratenthera senegalensis* Walp. Repert. 3: 347, 1844-45.

An erect viscid annual 15-30 cm high, with branches ascending, often becomes completely branched in the late season. Leaves 2.5 \times 0.2-0.4 cm, sessile, linear to narrowly-lanceolate, acute, attenuate at the base. Flowers solitary axillary on filiform 1-2 cm long bracteate pedicels deflexed laterally; corolla about 1 cm long, pale, often the tips of petals tinged purple. Capsule ovoid, acuminate or beaked at the apex, pubescent, pale-brown, obscurely veined, extruding from the persistent calyx.

Govt. College campus, Ajmer, V. S. Sharma 1625, 1626, Ajit Sagar, Khetri near Pilani, K. K. Kanodia 145, 181.

Fl. & Fr. Sept.-Oct.

Distribution:—Punjab Plain, Sindh-Westward through Arabia and tropical Africa to the Cape de Verde Islands.

Bacopa procumbens (Mill.) Greenm. in Field Columb. Mus. Bot. Ser. 2: 261, 1970; Hepper in Fl. West Trop. Afr. 2:

359, 1963; Backer & Bakh.f. Fl. Java 2: 507, 1965; *Erinus procumbens* Mill. Gard. Dict. ed.8. no.6, 1768. *Lindernia dianthera* Sw. Prodr. 92, 1788; *Pagesia dianthera* (Sw.) Pennell in Acad. Nat. Sci. Philad. Monogr. 1: 69, 1935. *Mecardonia dianthera* (Sw.) Pennell in Proc. Acad. Nat. Sci. Philad. 98: 87, 1946; Raizada in Ind. For. Rec. (n.s.) Botany 4(3): 68, 1951; Chatterjee & Bharadwaja in Bull. Bot. Soc. Beng. 9: 136, 1955; *Bacopa chamaedryoides* (H.B.K.) Wettst. in Engler et Prantl, Natur. Pflanzenfam. IV, (3b): 76, 1891; *Herpestis chamaedryoides* H.B.K. Nov. Gen. et. Sp. 2: 369, 1818.

An annual, diffuse, decumbent, glabrous herb; branches few from the base, 15-30 cm long, prostrate or ascending, often rooting at the lower nodes; stem 4-angled. Leaves opposite, decussate, almost sessile, ovate, rounded, crenate-serrate, subacute or obtuse, rounded, at times unequal sided at the base, glabrous above, minutely dotted on the under surface, unicostate, midrib sparsely branched. Flowers solitary, axillary, bisexual, zygomorphic; pedicels about 1-2 cm long, as long as or longer than flowers, 3-sided; bracteoles 2, arising from the base of the pedicel, 0.2-0.2 cm long, linear lanceolate. Calyx about 4 mm long, green, glabrous, nearly as long as the corolla, persistent, free or almost 5-partite. Sepals 5, free, unequal, posterior and the two anterior ovate, 3-5-veined, the two lateral linear, 1-veined, enclosed by the longer outer sepals; frequently one lateral sepal, usually the right one, rarely the left, or both provided with a green, linear basal appendage, which projects beyond the outer sepals and is bent towards the pedicel; all the sepals are somewhat enlarged in fruit and persist after dehiscence and shedding of the seed. Corolla gamopetalous, bilabiate, very shortly exserted, yellow with purple veins, the colour of the veins most intense towards the posterior side, gradually decreasing in intensity toward the anterior side, the veins of the anterior petal almost colourless; corolla-tube almost cylindric, neither saccate, spurred or plaited, nearly as long as the calyx; lobes small, spurred or plaited, nearly as long as the calyx; lobes small; upper lip outermost in bud, emarginate (notched), lower lip 3-lobed, lobes spreading, the anterior slightly notched; a tuft of hairs on the posterior side in the throat of the corolla. Stamens 4, didynamous arising from the base of the corolla-tube, included; filaments slender, filiform; anther-cells roundish, separate, stipitate, dehiscing by longitudinal slits. Disk prominent, hypogynous, greenish yellow; gynoecium bicarpellary, syncarpus; ovary superior, 2-celled with numerous ovules; style slightly dilated at top but not winged, curved towards the anterior side of the flower near the apex; stigma entire, blunt. Carpels about 4 mm long, smaller than the enclosing persistent calyx, cylindrical, 2-valved, septifragal; valves entire or slightly notched at the tip. Seeds numerous,

minute; testa reticulate, with light brown meshes and dark brown net work.

New Forest, Dehra Dun, *H.B. Naithani*, 3532; *Raizada* Dehra Dun Herb. No. 80214; College of Science, Benaras Hindu University, *A. C. Joshi*, Dehra Dun Herb. No. 100360; Bindal, Dehra Dun *C. R. Babu* 33273.

Fl. & Fr. Almost throughout the year.

Distribution.—Native of tropical America, probably introduced into India after 1897 (*Chatterjee & Bhardwaja*, *Bull. Bot. Soc. Beng.* 9(2): 136 and 137, 1955) and now naturalized in Assam, West Bengal, M.P., U.P. & Bihar.

Backer & Bakhuizen f. (*Fl. Java* 2:507, 1965) treated this plant under *Bacopa procumbens* (Mill.) Greenm; however, *Pennell* (l.c.) considers these two as distinct.

Pennell (loc. cit.) 946 treated this plant under the genus *Mecardonia* Ruiz. & Pav. (1794) which he maintained as distinct from *Bacopa* Aubl. (1775) nom. cons., by the name *Mecardonia dianthera* (Sw.) *Pennell*, which is based on *L. dianthera* Sw. (1788), a species considered by him as distinct from *Erinus procumbens* Mill. (1768). However, recently *Hepper* (loc. cit.) & *Backer & Bakh.f.* (loc. cit.) treated it under the genus *Bacopa*, and adopted *Bacopa procumbens* (Mill.) Greenm, as the correct name for this American plant.

The specific name *dianthera* (*Mecardonia dianthera*) is rather misleading as the flowers in the species have four stigmas.

Craterostigma plantagineum (Benth.) *Hochst.* in *Flora* 24: 669, 1841; *Hiern* in *Dyer*, *Fl. Capensis* 4: 361, 1904; *Skan* in *Dyer*, *Fl. Trop. Africa* 4: 329, 1906; *Blatter* in *Rec. Bot. Surv. Ind.* 8: 448, 1919; *Evans*, *Fl. Pl. S. Africa* 3: t. 106, 1923; *Andrews*, *Fl. Pl. Anglo-Egypt. Sudan* 3: 134, f. 36, 1956; *Thonner* *Fl. Pl. Africa* 494, 1962; *Maheshwari & Singh* in *Bull. Bot. Surv. Ind* 13 (1 & 2): 11-12, figs. 1-9, 1971. *Torenia plantaginea* Benth. in *DC. Prodr.* 10: 411, 1846.

A densely pilose, acaulescent, perennial herb, with a thick stout root-stock, 1-3 cm long, densely covered with several stout roots 3-10 cm long. Leaves radical, rosulate, 3-9 in a whorl, vertical, ovate to ovate-lanceolate, sometimes spatulate, somewhat fleshy, 2.8-4 × 1.5-2.2 cm, entire, ciliate-margined, obtuse, glabrous or sparingly pilose above, densely pilose beneath, usually 5-nerved; nerves prominent beneath; base narrowed into a short winged petiole; petioles 8-15 × 3-5 mm, pilose on both sides. Scapes usually 2.5-10 cm long, unbranched, solitary or more, arising from the centre of the leaf-rossette, quadrangular, pilose; flowers violet purple, 1.5-2 cm in length, usually paired, sometimes more, in racemes. Bracts

opposite, foliar, ovate-lanceolate to lanceolate, concave, 8-15 × 4-8 mm, sessile, entire, ciliate, acute, glabrous above, pilose on the back, with a prominent mid-rib, each enclosing one or more flowers. Pedicels 2-4 mm long; lower pedicels sometimes reaching upto 1.5 cm in length, forming corymbose racemes. Calyx tubular, 5-angled or ribbed, sparsely pilose or pubescent, but more densely along the ribs, 6-8 mm long, accrescent reaching upto 1 cm in length; teeth 5, subequal, 1-2 mm long in flower, reaching upto 4 mm in fruit, deltoid-ovate, acute, ciliate. Corolla violet-purple, 1.2-2 cm long, bilipped; upper lip erect, 2-lobed, 4-5 mm broad, lobes deltoid ovate; the lower lip 3-lobed, spreading, 7-10 mm broad, lobes oblong, middle one largest; corolla-tube 7-10 mm long, slightly pubescent outside, dilated upwards. Stamens 4, didynamous; anthers dimorphic. Posterior pairs of stamens subincluded inserted in the middle of corolla-tube; filaments filiform, not exceeding 2 mm in length, anthers oblong-linear, about 1 mm long, approximate, glabrous. Anterior pair of stamens exserted, attached to the throat of corolla-tube; filaments elongate, upto 5 mm in length, arched, appendaged at the base, sometimes connivent beneath the upper lip; anthers about 2 mm long, gibbous. Carpels 2, syncarpous, placentation axile. Ovaries oblong, ovoid or ellipsoid, glabrous, 2-3 mm long, bilocular, many-ovuled. Styles filiform, upto 1 cm long, dilated upwards, stigmas shortly bilamellate at the apex. Capsules oval or oblong, narrowed at the ends, slightly 5-angled, 8-1 × 0.3 mm, as long as the calyx, smooth, glabrous, septicidal, blackish at maturity; valves 2, entire, style base persistent. Seeds many, oblong, about 1 × 1 mm, flat, smooth on the lower surface, convex and tubercular-rugulose on the upper surface, brown, with persistent funicles at the base.

Shivpuri, J.K. Maheshwari 71433; Gora, Kolaras Forest Range, Shivpuri, Day & Pandey Dehra Dun Herb. No. 149755.

Fl. & Fr. Aug.-April.

Limnophila chinensis (Osbeck) Merr. in Am. Journ. Bot. 3:581, 1916; Husain in Ind. For. 93(5): 584, 1967; *Columnnea chinensis* Osbeck, Dogbok Ostend Resa 230, 1757; *Limnophila hirsuta* Benth. in DC. Prodr. 10:388, 1846; Hk. f. in Fl. Br. Ind. 4:268, 1884; Haines, Bot. Bihar and Orissa 2:658 (Repr. ed. 1961).

A marshy aromatic herb, 25-30 cm high. Stem erect, scarcely hairy; upper portion with minute glands. Leaves opposite, crowded at the upper portion of the stem but sparse on the lower, 2.5-3 cm long, 0.75-1 cm broad, oblong-lanceolate, leaf base narrowed down to short petiole, serrulate, 3-4-nerved, evenly gland-dotted on both the surfaces, golden brown resinous

substance present in glands (even in dried specimens). Inflorescence solitary axillary, pedicellate flowers at the top of the stem; pedicel 5 mm long, filiform and glandular. Flowers 1.75-2 cm long (including pedicel), lilac blue; bracts 2, linear, dotted, 3 mm long. Calyx 5, unequal, narrowly lanceolate, glandular pubescent, bigger one 6 mm long, 1 mm broad, with bifurcated tips. Corolla 5-lobed, 8 mm-1 cm long, 0.25-3 mm broad, slightly hairy, lilac blue with yellow throat. Stamens 4, didynamous, antherlobes separate and slightly stipitate; the filaments forming an appendage like structure at the upper end in between the anther lobes, filaments flattened throughout the length. Carpel 2, style one, stigma shortly 2-lamellate. Capsule elliptic-oblong, 2 mm long, 1 mm broad. Seeds numerous, brown to black, minute, finely reticulate.

Morthal, Aligarh, *Husain* 872, 884, 902. Found in stagnant waters in association with *Ceratophyllum* and *Hydrilla*.

Fl. Oct. Fr. Feb.

Limnophila rugosa (Roth) Merr. Interpr. Rumph. Herb. Amboin, 466, 1917; Pennell (in Acad. Nat. Sci. Philad. Monogr. 5:26, 1943; Backer & Bakh. f. Fl. Java 2:505, 1965; Chatterjee & Bharadwaja, in Bull. Bot. Soc. Bengal 9:137, 1955; *Herpestis rugosa* Roth, Nov. Sp. Pl. 290, 1821; *Limnophila roxburghii* G. Don, Gen. Syst. 4:41, 1838; Hk. f. in FBI. 4:265, 1884; Raizada in Journ. Ind. Bot. Soc. 15:163, 1936.

A creeping erect, annual, strongly aromatic, herb, 15-100 cm tall; stems terete, creeping and rooting at the base, with erect branches, often purple-tinged, glabrous downwards, patent hairy towards the apex, gland-punctate. Leaves opposite, ovate-elliptic-oblong, narrowed into a petiole, with a decurrent base, subobtusate, shallowly serrate, gland-dotted beneath, nerves depressed above, prominent beneath, 4-10 (-12) \times 1.5-4 cm. Flowers 1 cm across, sessile in head-like spikes; peduncle 0.2-0.5 cm long; bracts leaflike, 1-2 cm long; calyx divided halfway down, hairy 0.9-1 cm long; segments unequal, lanceolate, 0.5-0.7 cm long; corolla-tube yellow, 1-1.5 cm long, limb lillac, upper lip emarginate, lower lip 2-lobed. Fruit 0.5 cm long.

Mothronwala, Dehra Dun, *Raizada* Dehra Dun Herb. No. 62167; Nalapani, *Ram Sukh* (Duthie's collector) 23023; Robber's Cave, *C.R. Babu* 34028; Rishikesh, *H.B. Naithani* 3234. Common in marshy and swampy localities.

Fl. & Fr. Sept.-Nov.

Distribution :—Plains of N. India and outer Himalaya; Assam, Bengal, Central India; common in China, Philippines, Java.

Lindernia hookeri (Cl.) Wettst. in Pflanzenfam. 4, 3b:79, 1891. subsp. *kumaunensis* Pennell in Acad. Nat. Sci. Philad. Monogr. 5:30, 1943; Mukerjee in Journ. Ind. Bot. Soc. 24:130, 1945; Saxena in Journ. Bom. Nat. Hist. Soc. 64(1):86, 1967.

An erect herb, 4-5 cm high. Stem unbranched (or branched), with few scattered hairs or glabrous. Leaves ovate, ovate-lanceolate or lanceolate, 1-1.5 (-2.5) cm long, entire or remotely crenate-serrate, glabrous or hairy on the veins; petiole glabrous or hairy. Pedicels spreading, longer than or equal to the calyx, hairy or glabrate, 2-4 together at the terminal pair of leaves. Calyx 5-6 mm long in flower, 7-9 mm in fruit; sepals at first united about $1/3-3/4$ length, hispid with spreading hairs, especially along the ribs, but later separating irregularly to the base. Corolla blue-purple, 7 mm long. Capsule septicidal, shorter than calyx.

Rajpur near 'Sal' forest, Saxena 2315; Rispana, Dehra Dun, C.R. Babu 34701.

Fl. & Fr. Sept.-Oct.

Distribution :—So far known from Dehra Dun, Kumaon & Madhya Pradesh only.

This subsp. differs from ssp. *hookeri*, which is an Eastern Himalayan form by being less hairy.

Lindernia hyssopioides (Linn.) Haines, Bot. Bih. & Or. 635, 1922; Mukerjee in Journ. Ind. Bot. Soc. 24:132, 1945; Wazahat Hussain in Ind. For. 93(8) : 584, 1967; *Gratiola hyssopioides* Linn. Mant. 2:174, 1771; *Ilysanthes hyssopioides* Benth. in DC. Prodr. 10:419, 1846; Hk. f. in FBI. 4:283, 1884.

A straggling slender herb, 20-45 cm high. Leaves sessile, in distant pairs, $0.6-1.8 \times 0.3-0.6$ cm oblong or oblong-lanceolate, upper linear, smaller, entire; flowers pale blue or white with dark markings, solitary, axillary; pedicels 1-2.5 cm long, filiform. Capsules up to 0.6 cm long, ovoid-oblong.

Pilakhana, dist. Aligarh, Raizada; Atrauli Road, Aligarh, Hussain 787; Central Dairy Farm, Aligarh, Hussain 855.

Fl. & Fr. Sept.-Nov.

Distribution :—India (Bihar & Orissa, Tamil Nadu, Andhra, Khasi Hills, especially in rice fields; Bangladesh, Burma, Ceylon, Malaya, China.

Lindernia ruellioides (Colsm.) Penn. in Brittonia 2: 182, 1936 et in Journ. Arn. Arb. 20: 81, 1939; Mukerjee in Journ. Ind. Bot. Soc. 24: 133, 1945; Philcox in Kew Bull. 17: 484, 1964 et in lot. cit. 22: 54, 1968; Backer & Bakh.f. Fl. Java 4:512, 1965;

Gratiola ruellioides Colsm. Prodr. Desc. Grat. 12, 1793; *G. reptans* Roxb. Fl. Ind. ed. Carey & Wall. 1: 140, 1820; *Bonnaya reptans* (Roxb.) Spreng. Syst. Veg. 1: 41, 1824; Hk.f. in FBI. 4: 284, 1884.

An erect, simple or branched, glabrous, annual herb. Stem creeping and rooting at the base. Leaves on 0.2-0.25 cm long petioles, ovate-oblong, acute and often decurrent at base, obtuse or rounded at apex, $0.7-5 \times 0.4-2$ cm, densely regularly acutely serrate. Flowers in glabrous racemes; bracts subulate, 0.2-0.5 cm long; pedicels 0.5-1 cm long; calyx 0.5-0.6 cm long, glabrous, segments linear-lanceolate; corolla bluish-purple, 1-1.5 cm long; fertile stamens 2; staminodes clavate; capsule cylindrical, 2-2.5 cm long.

Dehra Dun, *Raizada* in damp shady places; Rispana, Dehra Dun, C.R. Babu 34904. Common in rice-fields.

Fl. & Fr. Sept.-Nov.

Specimens from this area more closely allied to *L. verbenae-folia* (Colsm.) Penn., which has been reduced by Philcox (loc. cit.) to *L. antipoda* (Linn.) Alst. (in Trim. Hand. Pl. Ceylon Supp-6: 214, 1931).

Lindernia sessiliflora (Benth.) Wettst. in Pflanzenfam. 4, 36, 79, 1891; Mukerjee in Journ. Ind. Bot. Soc. 24:132, 1945; Philcox in Kew Bull. 22: 10, 1968; *Vandellia sessiliflora* Benth. Scroph. Ind. 37, 1835; Hk.f. in FBI. 4: 282, 1884.

An erect or decumbent-ascending, simple or often much branched, annual herb. Stems often creeping and rooting below, 4-angular, hairy in the axils. Leaves sessile, rounded-orbicular, rounded or subcordate at base, glabrous except hairy nerves beneath, shortly ciliolate, $0.4-1 \times 0.4-1$ cm. Flowers subsessile, in 1-4-flowered terminal clusters; calyx 0.2-4 cm long, segments linear-lanceolate; corolla white, 0.4-0.6 cm long, upper lip brown, lower lip with a purplish-centre. Capsule cylindrical, acuminate, 0.8-1 cm long.

Dehra Dun *Raizada* s.n.; Bindal, Dehra Dun, C. R. Babu 34097; New Forest Dehra Dun, H. B. Naithani 3662; common on damp shady rocks of ravines and river-banks.

Fl. & Fr. Sept.-Nov.

Distribution :—Tropical Himalaya alt. 600-2100 m from Kashmir to Mishmi and Khasi Mts.; Bihar on Parasnath hills.

This species is closely allied to, and in fact reduced by Pennell (Acad. Nat. Sci. Philad. Monogr. 5: 31, 1943) to *L. nummularifolia* (Don) Wettst. but is distinguishable only by sessile flowers, longer calyx, longer corolla and long acuminate capsule.

Lindernia viscosa (Hornem.) Boldingh, Zakfl. Landbouwwstr. Java 165, 1916; Li in Quart. Journ. Tawan. Mus. 14: 4, 1962; Merr. Sp. Blanc. 14, 1918; Pennell in Journ. Arn. Arb. 24: 251, 1943; Santapau in Journ. Bom. Nat. Hist. Soc. 49: 37, 1950 (1952); Philcox in Kew Bull. 2: 38, f.9, 1-5, 1968; Backer & Bakh.f. Fl. Java 3: 656, 1968; *Gratiola viscosa* (Hornem.) Willd., Enum. Pl. Berol. 645, 1809; *Vandellia hirsuta* Buch.-Ham. ex Benth., Scroph. Ind. 36, 1835; Hk.f. in FBI. 4: 280, 1883; Raizada in Journ. Ind. Bot. Soc. 15: 164, 1936; *Lindernia hirsuta* (Ham. ex Benth.) Wettst. in Pfam. 4 (3b): 79, 1891; Chatterjee & Bharadwaja in Bull. Bot. Soc. Beng. 9: 143, 1955.

An annual diffuse herb with ascending branches from base or unbranched, erect 4-15 cm tall; stems sharply 4-gonous, sparsely hirsute. Leaves 15-40 × 10-21 cm, ovate, or ovate-elliptic, serrate, or subentire, obtuse, subacute at apex, upper leaves rounded at base and sessile, lower leaves tapering at base into petioles; petioles about 4 mm long. Flowers opposite, in lax axillary and terminal racemes; peduncles 7-22 mm long, 4-gonous; pedicels 3-5 mm long, elongating in fruit; bract about 1 mm long, lanceolate acute apex. Calyx 2.5-3 mm long, 5-lobed up to base or nearly so; lobes subequal, linear-lanceolate, hirsute, acute. Corolla 5-5.5 mm long, white with the upper lip yellowish-brown without; stamens 4; filaments of lower pair long, arched, glabrous, a small oblong sessile gland at base; anthers coherent. Ovary glabrous, style dilated upwards; stigma 2-lamellate, lobes unequal; capsule 3-4 mm long, ovoid-subglobose, glabrous. Seeds numerous, yellowish.

Dholkhand, near Saharanpur, Raizada; Saharanpur, Osmaston (16-9-1928); Rispana, Dehra Dun, C. R. Babu 34905; common on rocky slopes and shady localities in 'Sal' forest.

Fl. & Fr. Aug.-Sept.

Distribution:—West Bengal, Bihar, U. P., Tamil Nadu and Western Peninsula in India; Sikkim extending to Southern China, Malaysia and the Philippines; Ceylon.

The binomial *Lindernia viscosa* has often been attributed to Merrill (Sp. Blanc. 14, 1918) by different authors, including Philcox. Li (l.c.) pointed out that the earliest combination was made by Boldingh l.c. (1916) based on *Gratiola viscosa* Hornem. (1807), so the name of this plant should be *Lindernia viscosa* (Hornemann) Boldingh.

According to Philcox, the correct name of this species should be *L. viscosa* (Hornem.) Merr., but Boldingh's combination is older. Philcox rejected Boldingh's name because it was published in a descriptive key, hence invalid in his opinion.

The Code, however, is silent on the validation of names published in descriptive keys. As characters were given, and Boldingh's *Zakflora* justifies to a careful examination of the author's names, I do not hesitate in accepting Boldingh's name, though it must be regretted that basionyms were omitted everywhere.

Mazus delavayi Bonati in Bull. Herb. Boiss. (Ser. 2) 8:530, 1908; Li in Brittonia 8:32, 1954; Pennell in Acad. Nat. Sci. Philad. Monog. 5: 34, 1943; Hara in Fl. E. Himl. 288, 1966; Saxena in Ind. For. 93 (5); 329, 1967.

An annual hirsutulus herb. Leaves sessile, oblanceolate to narrowly obovate, long cuneate, dentate. Flowers white, many, in terminal racemes; pedicels shorter than calyx. Calyx 5-lobed; lobes half as long as the calyx.

Dehra Dun *Raizada* s.n., *Saxena* s.n.; *H.B. Naithani*. Ser. II. No. 81 New Forest, Dehra Dun, occasional in lawns, also streams near about Dehra Dun.

Fl. May-June. Fr. July-Oct.

Distribution:—Lower valleys in the Himalayas; Simla; Yunan.

This species is closely allied to *Mazus pumilus* (Burm. f.) Van Stenis, Nova Guinea n.s. 9:31, 1958, syn. *Mazus japonicus* (Thunb.) O. Ktze = *M. rugosus* Lour, which, however, differs in the pedicels and stems being quite glabrous and the pedicels, at least the lower, being much longer than the calyx.

Melasma thompsoni (Hook. f.) Wettst. in Engl. and Prantl, Pflanzenfam 4 (3b):91, 1891; *Alectra thompsoni* Hook. f. in Fl. Br. Ind. 4:297, 1884; *Raizada* in Proc. Nat. Inst. Sci. India 24(4): 201, 1958.

A slender parasite; stem rigid but flexuous, 15-28 cm high, simple or branched at the root stock, hardly scaberulous. Leaves represented by a few scattered scales 1-4 mm, slender, the largest oblong, obtuse. Racemes 15-25 cm, lax-flowered; bracts minute; flowers pedicelled, yellow; pedicels slender up to 6 mm. Calyx fruiting hemispheric, 2.5 mm across, lobes broadly triangular; filaments bearded. Capsule globose as long as the calyx. Seeds minute, elongate-cuneiform.

Banda, *Sri Ram* Dehra Dun Herb. No. 90375.

Distribution:—Bihar on Parasnath hills, parasiting *Strobilanthes*.

Incidentally the correct name of *Alectra indica* Benth. (in DC. Prodr. 10:399, 1846), a species which occurs in the Western Himalaya, is *Melasma avense* (Benth.) Hand.-Mazz., Symb.

Sinica, pt. 7:843, 1936 (*arvensis*); vide Raizada in Ind. For. 94(6):445, 1968, as it is based on *Glossostigma avensis* Benth. Scroph. Ind. 49, 1835: The correct epithet for this taxon is 'avense', named after Mount Ava, not *arvensis*.

Mella hamiltoniana (Benth.) Pennell in Acad. Nat. Sci. Philad. Monog. 5:23, 1943; *Herpestis hamiltoniana* Benth. Scroph. Ind. 30, 1835; Hk. f. in FBI 4:272, 1884; Raizada & Saxena in Journ. Bom. Nat. Hist. Soc. 64 (i) : 87, 1967.

A herb 4 cm or more high; stem 4-angled. Leaves opposite, sessile, linear-lanceolate, entire. Flowers axillary, sessile. Sepals 5, unequal, upper broadly ovate, nearly as long as broad, truncate at the base; lateral sepals ovate or lanceolate, the inner linear-oblong, shorter than capsule. Corolla pinkish, narrow, zygomorphic, hardly exceeding the calyx, with cylindric tube and spreading lips. Capsule globose. Seeds very many, minute.

Rare in open grassy places near 'Sal Forests' Rajpur, Saxena 2312; Raizada s. n.; Ajabpur, Dehra Dun, H.B. Naithani Ser. II No 13.

Fl. Sept.

Distribution :—North India ascending to 950 m, Malabar, Bengal, Assam; Bangladesh; Senegal.

Microcarpaea minima (Koen.) Merr. in Philipp. Journ. Sc. Bot. 19:100, 1912; Backer & Bakh. f. Fl. Java 2:508, 1965. *Microcarpaea muscosa* Br. Prodr. 436, 1810; Hk. f. in FBI. 4: 287, 1884; Srivastava in Journ. Bom. Nat. Hist. Soc. 53:152, 1955. *Paederota minima* Koen. in Retz. Obs. 5:10, 1789.

A very small slender diffuse or creeping nearly glabrous herb, 5-10 cm long, rooting at nodes. Leaves opposite, sessile or subsessile, oblong, obtuse, entire up to 3 mm long. Flowers minute, axillary, solitary, sessile, ebracteate. Calyx 2.5-3 mm long, tubular, 5-angled, 5-fid, lobes acute, recurved, ciliate; corolla very short, tube broad, shorter than calyx; lobes 5, broad, spreading, 2 upper subconnate, pale purple. Stamens 2, perfect, filaments filiform; anthers confluent, 1-celled; staminodes 0. Style filiform, up to 1.5 mm; stigma capitate, recurved. Capsule minute, included, ovoid, 2-grooved, loculicidal; valves entire separating from the placentiferous septum. Seeds few, ovoid.

Mirzapur, J.G. Srivastava 1955.

Fl. & Fr. Rainy season.

Distribution :—Lower Bengal, Malabar; Tenasserim; Ceylon, Java, China, Australia.

Peplidium martinum (L. f.) Wettst. in Engl. et Prantl. Natural. Pflanzenfam. 4(3): 78, 1891; Raizada & Sharma in Ind. For. 88(5): 365, 1966; *Hedyotis maritima* Linn. f. Suppl. 119, 1781; *Peplidium humifusum* Del. Fl. Egypte 148, t. 4, 1812; Hk. f. in FBI. 4:287, 1884.

An aquatic or limicolous glabrous herb with slender stems; when in water, stems 1-5 cm long, several from the spongy rootstock, branched mainly on reaching the surface and forming leafy floating patches; when on mud with stem and branches completely interwoven and rooting freely at nodes. Radical leaves rosulate, 1.5×5.1 cm, spatulate. Cauline opposite, $0.3-2.5 \times 0.2-1$ cm, spatulate, oval or obovate, strictly supinous, fleshy like the radical. Flowers minute, solitary or up to 3 in a axil. Corolla creamy or pure white. Capsule 2-3 mm in diameter, ovoid to nearly globose, deeply 2-grooved along the septa. Seeds minute, light brown.

Ajmer district: Kishangarh, V. S. Sharma 875; Kharwa, V.S. Sharma 1274; Raoli, V. S. Sharma 1317; Foyasagar, V.S. Sharma 1413; Jawaja, V. S. Sharma 1564.

Fl. & Fr. Nov.-April.

Distribution:—South Deccan Peninsula; Ceylon, Egypt, Australia.

The plant has a dual habit. When in water, it has long floating stems but after reaching on mud when water recedes, it soon becomes excessively branched to form compact patches holding the mud strongly by nodal rooting; the radical leaves also disappear when the plant establishes itself on the mud. The presence of radical leaves is not mentioned in the floras consulted and it appears that their descriptions are based on the specimens showing the later habit.

The species is frequent near the margins of tanks and muddy fields.

Russelia equisetiformis Cham. & Schl. in Linnæa 6: 377, 1831; Chatterjee & Bharadwaja in Bull. Bot. Soc. Beng. 9: 132, 1955; Backer & Bakh. f. Fl. Java 2:502, 1965; *R. juncea* Zucc. in Fl. 15(2), Beibl. 99, 1832; Bor & Raizada, in Beaut. Ind. Clim. & Shrubs 227-228, 1954.

A shrub 36-48 cm or more high with long rush-like ribbed green stems; branches very slender, whorled. Leaves small, whorled, the upper opposite about 2 mm long, linear. Flowers 2 cm long, scarlet; calyx 2 mm long, campanulate; corolla tubular; limb small, about 2 cm across, 2-lipped, subequally 5-lobed. Stamens 4, didynamous, included. Fruit a capsule but rarely set in India.

Commonly grown in gardens in the plains.

Fl. Freely most part of the year.

Distribution.—Indigenous to Mexico.

Another species *R. sarmentosa* Jacq. [*R. coccinea* (Linn.) Wettst.] is also cultivated in gardens.

Striga angustifolia (Don) Saldana in Bull. Bot. Surv. India 5(1): 70, 1963; Panigrahi et al in Bull. Bot. Surv. Ind. 11(1 & 2): 107, 1969; *Buchnera asiatica* Linn. Sp. Pl. 630, 1750 pro parte (?); Vahl., Symb. Bot. 3:81, 1794 (nom. rej.); *Buchnera angustifolia* Don, Prodr. 91, 1825; *Buchnera euphrasioides* Benth. Scroph. Ind. 41, 1835 (non Vahl, Symb. Bot. 3: 81, 1794); *Striga euphrasioides* (Benth.) Benth. in Hook. Comp. Bot. Mag. 1: 364, 1836; Hk.f. in FBI. 4: 299, 1884; Cooke, Fl. Bom. 2: 303, 1905; Van Buren in Poona Agric. Coll. Mag. 5: 283, 1914; Gamble Fl. Madras 968, 1924; Barnes in Journ. Ind. Bot. Soc. 15: 128, t. 11, 1936; Santapau in Journ. Bom. Nat. Hist. Soc. 49: 44, 1950; *S. asiatica* Pennell in Acad. Nat. Sc. Phil. Mon. 5: 96, 1943 (non all. auct.).

An erect scabrid parasitic herb 15-43 cm high. Stem simple or branched. Leaves sessile, erect up to 4 cm long, linear, acute, passing into floral bracts; bracts longer than the calyx. Calyx about 4 mm long, lengthening in fruit; calyx-ribs 5, more than the number of normal lobes; 3 calyx-ribs terminating at the tip of each lobe. Flowers white, spikes often very long, tube curved above the middle, upper lip much shorter than the lower; corolla exserted. Capsule oblong-ovoid, included within the calyx.

Bahraich, Panigrahi 6662 A.

Distribution.—Tamil Nadu, Bombay.

Striga sulphurea Delz. & Gibs. Bombay Fl. 182, 1861; Hk.f. FBI. 4: 300, 1884; Cooke, Fl. Bombay 2: 304, 1957; (Rep. ed.); Santapau, Fl. Khandala 184, 1967.

A very slender, scabrid herb; stem 4-angled, up to 30 cm high. Leaves linear, extremely slender, almost sessile; flowers few, distant, all axillary or the upper subspicate, shorter than floral leaves. Calyx very narrow, 1.3-2 cm, 15-ribbed, lobes filiform equalling the tube; tube ventricose, ribs very strong. Corolla yellow, limb about 3.8 cm in diameter.

Mala Swamp, Pilibhit, C. L. Malhotra 50773 (Sept. 9, 1972), rare in grassland, near swamp.

Fl. & Fr. Sept.-Nov.

Distribution:—The Concan.

Torenia fournieri Linden ex Fourn. in Ill. Hort. 5: 23, 129. t. 249, 1876; Bailey, Man. Cult. Pl. ed. 2. 897, 1949; Chatterjee & Bharadwaja in Bull. Bot. Soc. Beng. 9(2): 141, 1955; Backer & Bakh.f. Fl. Java 2:509, 1965.

An erect, widely branched, glabrous annual herb, 15-50 cm tall. Stems 4-angular-4-alate, quite glabrous. Leaves on 0.5-2 cm long petioles, ovate-triangular-lanceolate, truncate-cordate, rounded at the base, acute, serrate, glabrous or thinly hairy, 2.5×1.5-4 cm. Flowers 2.5-3 cm across, in racemes; pedicels 4-angular, 1-1.5 cm long; calyx 1.8-2 cm long, broadly 5-winged, ciliate on the wings; corolla-tube pale-purple, yellow on dorsal side, 2-2.5 cm long; lobes of lower lip tipped by a bluish-purplish spot, long stamens inappendiculate.

Bindal, Dehra Dun C.R. Babu 34029.

Frequently cultivated in gardens in Dehra Dun as an ornamental. Occasionally met with as an escape, but not yet naturalized; native to Cochinchina. There are some white flowered varieties also.

Fl. Sept.-Nov.

Veronica didyma Tenore, Prod. Fl. Nap. 6, 1811; Pennell in Acad. Nat. Sci. Monograph 5: 25, 1943; Chatterjee & Bharadwaja in Bull. Bot. Soc. Beng. 9(2): 148-149, 1955.

This species has been mentioned by Pennell l.c. from Dehra Dun (collected by E. Krishnan, No. 24, Gray Herbarium of Harvard University, Cambridge, Mass.). It has been recently introduced in India from Europe and now has naturalized in certain parts of India. It ascends in the Western Himalayas upto 2,500 m.

It differs from the other species of *Veronica* in the following characters:

"Capsule 3-4 mm wide, minutely greyish pubescent, plane, notched 1/3, depth the cells rounded; style 1 mm long; corolla 5 mm wide; sepals ovate, ciliolate; pedicels recurving, shorter than the subtending bracts" (Pennell l.c.).

Fl. during March and April.

Veronica javanica Bl. Bijdr. 742, 1826; Hk.f. in FBI. 4: 296, 1884; Penn. in Acad. Nat. Sci. Philad. Monogr. 5: 87, 1943, pro parte (excl. syn.) *V. deltigera* Wall. ex Benth.; Montserrat in Kew Bull. 1955: 491-494, 1955; Backer & Bakh. f.Fl. Java 2: 512, 1965.

An erect or decumbent ascending, annual herb. Stems often much branched from the base, densely hairy with crispy long hairs. Leaves subsessile or on 0.3-0.5 cm long petioles, ovate rounded, cuneate or rounded or truncate at base, subobtusate, crenate-serrate, hairy, $0.5-2 \times 0.4-1.5$ cm. Flowers in short axillary, 5-15-flowered, spike-like racemes 0.5-2.5 cm long; bracts linear, 0.25-0.5 cm long, hispidly hairy, segments oblanceolate-spathulate; corolla blue or white, 0.15-0.2 cm long, lobes rounded; style 0.03-0.05 cm long. Capsule obcordate, ciliate, keeled, $0.2-0.25 \times 0.3-0.4$ cm. Seeds ovoid, 0.05×0.03 cm.

New Forest, Dehra Dun, *Raizada*, H.B. Naithani 3244; Robber's Cave, Dehra Dun, C.R. Babu 35231; Rispana, C.R. Babu 35020. It is met with in grassy shady localities of river beds and ravine slopes.

Fl. & Fr. March-May.

Montserrat (loc. cit.) pointed out that *V. deltigera* Wall. ex Benth., which was erroneously reduced by Pennell (loc. cit.) to *V. javanica* Bl., is a distinct species and distinguished from this by perennial habit, and from *V. lanosa* Royle ex Benth., which was reduced to *V. deltigera* by Hooker f. FBI. 4 : 292, 1884), by axillary inflorescences.

Calceolaria chelidonioide H.B.K., a native of tropical America has been recorded from Dehra Dun by Pennell (loc. cit. 58), but the author has neither collected nor seen any specimens from this area in Dehra Dun Herbarium and Herbarium of the Botanical Survey of India, Northern Circle.

OROBANCHACEAE

Aeginetia indica Linn. var. *alba* Santapau in Kew Bull. 1948(3) : 491; K.M. Vaid in Journ. Bom. Nat. Hist. Soc. 61: 471-472, 1964 et loc.cit. 65 (2) : 525, 1968.

The variety differs from the typical species in that the corolla is pure white and slightly longer than in the typical variety (which has purple flowers) as also the calyx and the scape which are of lemon-yellow colour.

Chir Plantation, New Forest, Dehra Dun, K.M. Vaid (photo); New Forest, Dehra Dun, K.M. Vaid 5412 (17-9-1967).

Distribution :—Khandala, near Bombay.

LENTIBULARIACEAE

Utricularia arenaria A. DC. in DC. Prodr. 8:20, 1844: Saxena in Ind. For. 92:493, f. 1, 1966; 92:657, 1967.

A terrestrial herb. Leaves many, narrowly obovate to oblanceolate. Traps ovoid, mouth terminal; lips provided on the inner surface with radiating comb-like rows of gland-tufted hairs. Inflorescence erect, 1.5-3 cm long; flowers 1-3(-5) distant; scape filiform, papillose at the base; scales few basifixed; bracts and bracteoles basifixed. Calyx-lobes subequal, upper broadly ovate to more or less orbicular, lower slightly narrower, ovate-oblong. Corolla purple, 1.5 mm long; upper lip oblong, apex truncate, rounded (or emarginate); lower lip with small broad, saccate spur (in cleistogamous flowers). Capsule broadly ovoid or globose, 1-1.5 (-2.5) mm long.

Rajpur, Dehra Dun Dist. in wet places, *Raizada* s.n.; Rajpur, near sal forest in open wet places, *Saxena* 2327 (B).

Fl. & Fr. Oct.-Nov.

Distribution :—Pachmarhi (Madhya Pradesh); Tropical Africa and Madagascar.

Utricularia pubescence Sm. in Rees Cyclop. 37, no. 53, 1819; Taylor in Kew Bull. 18:101, 636-638, 1964; Saxena in Ind. For. 91:73, t. 1, 1965; *U. peltata* Spruce ex Oliver in Journ. Linn. Soc. Bot. 172, 1860.

A herb, 2-4 cm high; rhizoids few; stolons numerous, filiform, much branched; leaves numerous, one arising from the base of the scape, the rest scattered in the stolons, orbicular, pedate, petiolate; petiole narrowed to the base; lamina horizontal, fleshy, 1-5 mm in diameter, margin entire, nerves many, forked; abaxial surface covered with mucilaginous glands. Traps numerous, scattered on the rhizoids; stolons and petioles, more or less globose, 0.5-1 mm long, stalked, mouth terminal, upper lips projecting, lower lip not or scarcely projecting, both lips provided on the inner surface with radiating comb-like rows of short gland-tipped hairs. Scape filiform, more or less setulose, papillose or glabrous; flowers 1-4, distant, scales absent or rarely 2 present at the base; scales similar to the bracts; bracts basiolute, the part above the point of attachment much larger than that below, ovate lanceolate, about 0.1 mm long, with acute apex and rounded or truncate base, setulose or papillose; bracteoles similar but often much narrower; pedicels erect, short; calyx-lobes slightly unequal, setulose or papillose, upper lobe about 2 mm long, acute or acuminate, 4-7 nerved, lower lobe ovate to more or less orbicular, about 1.5×1 mm shortly acuminate with truncate, slightly emarginate or bidentate apex usually 4-nerved, rarely 5- or 7-nerved. Corolla bluish purple, slightly exceeding the calyx, upper lip more or less orbicular, apex rounded, entire; lower lip more or less orbicular, entire, limb folded down on the spur; spur very short, broad; stamens 0.2-0.4 mm long, attached

to the base of the corolla tube. Ovary ovoid, style short; capsule ellipsoid, 0.5-2 mm long, shorter than the upper calyx-tube. Seeds numerous, strongly reticulate.

The species is extremely variable in corolla size and the relative length of the spur. The Indian plant differs from the African plant only in having bluish-purple corolla, smaller in size, with very short, broad spur, the lower calyx usually 4-nerved, apex shortly acuminate and truncate at the tip; the leaves mostly having the petiole attached to the lamina slightly towards its margin and not exactly in the centre.

Rajpur in marshy places, *Raizada* s. n.; Rajpur in open marshy places among grasses near Sal forest, *Saxena* 2327 (A).

Fl. & Fr. Sept.-Oct.

Distribution :—Tropical Africa from Guinea to Angola and in S. America.

Utricularia scandens Benj. (1847) subsp. *scandens* Taylor in Kew Bull. 18:46, 1964 (non *U. scandens* Oliver 1859; C.B. Cl. in Hk. f. FBI. 4:332, 1884); *U. wallichiana* Wight, Ic. Pl. 4:9 and 12 (sphalm. *wallichii*) t. 1572, 1850; C.B. Cl. in FBI 4:332, 1884; *Raizada* and *Saxena* in Ind. For. 88:703, 1962, non Benj. 1845.

A terrestrial herb; rhizoids numerous; stolons rather few from the base of the scape, branched. Leaves linear, up to 1 cm long and about 1 mm wide, 1-nerved, apex obtuse or subacute. Traps globose, about 0.6/- 1 mm in diameter; mouth basal, upper lip with a single shorter truncate or shortly bifid appendage, the apex of which is usually densely glandular. Inflorescence erect or twining, usually 5-12 cm tall; scape filiform, glabrous; flowers 1-8, distant, usually alternating with sterile bracts; scales few, similar to the bracts; bracts basifixed, broadly ovate-deltoid, acute or acuminate, 1-1.5 mm long, nerveless, inner surface glandular; bracteoles linear-lanceolate, about as long as the bracts; pedicels about as long as the flowering calyx, narrowly winged. Calyx-lobes ovate to broadly ovate, 2.5-3 mm at anthesis, up to 5 mm long and often relatively broader in fruit, about 11-nerved, decurrent, slightly unequal, upper slightly longer, acute, lower very shortly trifid or bifid. Corolla yellow, 5-7 mm long; upper lip shorter and narrower than the upper calyx-lobes, emarginate or shortly bifid, lower lip shorter than the spur, subulate, acute, curved. Capsule dorsiventrally compressed, oblong ovoid, dehiscent by a single vertical slit; the capsule-wall locally thickened at the margins of the slit. Seeds broadly ovoid to elliptic, smooth, about 0.2 mm long; testa cells considerably longer than broad.

Rajpur, Pine plantation, *Raizada* s.n.; Boggy grasslands among and twining around grasses, sedges and *Eriocaulon* spp. near Sal forest, Rajpur, *Saxena* 2288; Pine plantation, Rajpur, *H.B. Naithani* Dehra Dun Herb. No. 149824.

Fl. & Fr. late Sept.-Oct.

Distribution:—Widespread in Central and South India: Sikkim, Khasi Mts.—Tropical Africa and Madagascar, extending to New Guinea.

Utricularia striatula Sm. in Rees Cyclop. 37. No. 17, 1819; P. Taylor in Kew Bull. 18:91, 1964; *U. orbiculata* Wall. ex DC. Prodr. 8:18, 1840; Clarke in Hk. f. FBI. 4:334, 1884.

A herb with filiform stolons which bears traps and leaves. Leaves in a rosette, on 0.3-0.4 cm long petiole, or bicular-rounded, 0.3-0.4 × 0.2-0.3 cm. Traps globose or obliquely ovoid, 0.6-0.8 cm across. Flowers in a 2-5 (-8)-flowered scapose racemes; bracts medifixed, oblong, obtuse; bracteoles similar to bracts, but slightly narrower; pedicels 0.2-0.4 cm long during anthesis, up to 6 cm long in fruiting; calyx-lobes unequal, accrescent, upper orbicular-obcordate, emarginate, 7-9-nerved, 1.5-2.5 cm long, lower ovate-oblong, nerveless, retuse, peltate; upper lip shortly bidentate, lower lip 5-lobed, spur subulate, straight, acute, 0.4-0.6 cm long. Fruit globose 0.2-0.3 cm long; seeds ovoid, glochidiate.

Robber's Cave, Dehra Dun on stones covered with moss, *Raizada* s.n. Common on mossy stones near waterfalls, Bindal, Dehra Dun, *C. R. Babu* 34088.

Fl. & Fr. Sept.-Feb.

Distribution:—Almost throughout India in the hills, Deccan Peninsula and Ceylon.

GESNERACEÆ

Aeschynanthus maculata Lindl. Bot. Reg. 1841, t. 28, 1815; Clarke in Hk. f. FBI. 4: 339, 1884.

An epiphyte. Leaves opposite, lanceolate, 10 × 3.5 cm. Pedicels often numerous. Calyx deeply divided, about 6 mm, lobes lanceolate acute. Corolla 2 cm narrow. Stamens 4, perfect, didynamous. Ovary superior, stipitate. Capsule long linear, loculicidally, 2-valved.

Dehra Dun, *Falconer* s.n.

Distribution:—Temperate Himalayas from Nepal to Bhutan. This species has not been collected from our area since Falconer's time.

Chirita bifolia D. Don, Prodr. 90, 1825; Clarks in Hk. f.

FBI. 4:357, 1884; Som Deva in Bull. Bot. Surv. Ind. 10(2):180, 1965.

An erect herb. Stem 7.5-15 cm. Leaves 2, opposite, sessile, unequal, cordate, broadly ovate, toothed, the larger about 7.5×6.5 , the other much smaller. Flowers 1-3, 4-5 cm long, deep purple-blue, tinged with yellow about the mouth. Calyx-lobes acute. Corolla funnel-shaped, lobes 5, rounded, spreading. Perfect stamens 2, staminodes 2; filaments flattened. Ovary narrowly oblong; style very short; stigma 2-lobed. Capsule about 7-10 cm, curved, finely pointed.

Shoerpur, Rau Dehra Dun Siwaliks, Raizada; Sahasradhara, Som Deva 2675, moist and shady situation along nala.

Fl. Rainy season, Fr. Late Aug.-Sept.

Distribution:—Temperate W. Himalaya up to 1850 m from Simla to Nepal.

Chirita pumila D. Don, Prodr. Fl. Nep. 90, 1825; C.B. Clarke in Hk.f. FBI. 4: 357, 1884; Collett Fl. Sim. 366, 1902; S.K. Malhotra in Maharashtra Vidhyan Madir, Patrika 5(1 & 2): 39, 1971.

An erect hairy herb, 9-20 cm high. Leaves 2-6, opposite, unequal, long or short stalked or the uppermost pair sessile, lanceolate to oblong-lanceolate, toothed, the larger leaf $4.5-10 \times 2-3$ cm, the other smaller. Flowers 1-6 on terminal scapes. Corolla funnel-shaped, 3-4 cm long and 1.7-2 cm across; limb pale-purplish or with pinkish tinge; tube white. Perfect stamens 2, staminodes 2; filaments flattened. Ovary narrowly oblong; style very short, stigma 2-lobed. Capsule 7-10 cm, curved, finely pointed.

Along moist rocky slopes, Sahasradhara, S.K. Malhotra 33993.

Fl. & Fr. Aug.-Sept.

Distribution:—Temperate W. Himalaya, up to 1850 m from Garhwal to Nepal.

This species is common and gregarious on moist shady hill slopes, 950-2000 m. in Mussoorie. It also occurs at Rajpur, Bhatta Fall, Murry Fall, Camels Back Road, etc.

Corallodiscus lanuginosus (Wall. ex DC.) B.L. Burt in Gard. Chron. 212, 1947; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1 & 2):40; 1971; *Didissandra lanuginosa* (DC.) C.B. Clarke in Hk. f. FBI. 4:355, 1884; *Didymocarpus lanuginosa* Wall. ex DC. Prodr. 9:268.

A scapose perennial herb. Stem hardly any, with the base of the petioles and peduncles fulvous-shaggy. Leaves crowded, 7.5×3.8 cm, obtuse, base attenuated, crenate, above deciduously hirsute, fulvous-woolly beneath when young; petiole up to 2.5 cm, or from the attenuation of the base, leaf base, 0. Scapes 5-15 cm, glabrate upwards; cymes young woolly, ultimately glabrate, compound; pedicels up to 1.5 cm. Sepals minute, lanceolate. Corolla about 2 cm long, hairy, pale blue or purple, 2-lipped. Anthers peltate, cohering in pairs; ovary glabrous, style minutely pilose. Capsule about 2 cm, often curved, acute.

Sahasradhara, on moist rocks, S.K. Malhotra 33911.

Fl. & Fr. Aug.-Sept.

Distribution :—Temperate Himalaya 1200-2400 m, from Simla to Bhutan, Sikkim, Khasia Mts.

Presumably Malhotra's specimen was collected above 1000 m or near about and as such the area does not fall within the limits of the flora.

Platystemma violoides Pl. As. Rar. 2:52, t. 151, 1831; C.B. Clarke in Hk. f. FBI. 4:361, 1884; Collett Fl. Siml. 366, t. 116, 1902 S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1 & 2) : 40, 1970.

A slender, pubescent, erect herb with solitary leaf at the top of the short stem, sessile, orbicular or broadly ovate, cordate, coarsely serrate or toothed. Flowers one or few on slender axillary peduncle. Calyx deeply 5-lobed. Corolla blue, deeply 2-lipped, 6-10 mm long, 6-7 mm across. Stamens 4, perfect; staminodes none; anthers cohering by their tips. Capsule narrowly oblong, 5 mm long with a long style persistent for sometime.

Sahasradhara, on moist rocks, S.K. Malhotra 29262, 23795.

Fl. & Fr. Sept.-Oct.

Distribution :—Temperate W. Himalaya, 1830-2700 m, from Simla to Nepal.

This species is common and gregarious on moist shady hill sides, 1400-2100 m. in Mussoorie, and I very much doubt if the specimen was collected at the base of Sahasradhara, it must have been collected much higher about 9050 m. I have never seen or collected it from Sahasradhara proper.

BIGNONIACEAE

Adenocalymma nitidum Mart. ex DC. Prodr. 9:200, 1845.

An extensively spreading, climbing shrub. Stems grey-

white to dull black. Leaves digitately compound, 2- to 3-foliolate. Leaflets ovate, acuminate, entire, leathery, shining. Tendrils leaf-modified, simple. Flowers golden-yellow, scented, large, showy in axillary, five-flowered racemes. Corolla trumpet-shaped.

Commonly grown in gardens for its large showy flowers, throughout the United Provinces, Delhi, etc. The ants are attracted by conspicuous, extra-floral glands on the calyx.

Fl. summer & rainy season.

Distribution :—Native of Brazil. The plant is often wrongly known as *Bignonia chamberlaynii* Sims.

Bignonia unguiscati Linn. Sp. Pl. 623, 1753; Bor & Raizada in Beautiful Ind. Climb. & Shrubs. 32, 1954.

A shrub climbing extensively by its 3-fid, claw-like tendrils, with a pair of glaucous, oblong, acuminate leaflets. Flowers clear yellow, with deeper yellow lines in the throat, borne in pairs seated on slender peduncles in the axils of leaves. Calyx 5-lobed, membranous, bowl-shaped, with conspicuous veins, about 1.5 mm long; corolla with a short tube and broadly ventricose limb with spreading lobes, 5-10 cm across, 5-11 cm long; ovary linear, seated on a fleshy disk; style curved. Fruit about 30×1.3 cm, narrowly linear; valves leathery.

Commonly grown in gardens around trunks of trees and on trellis where it climbs by its 3-fid, hooked tendrils. It is extremely beautiful when in flower.

Fl. Jan.-June.

Distribution :—Native of Argentina now, frequently cultivated in India.

Campsis grandiflora (Thunb.) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(3b), 230, 1894; Bor & Raizada in Beautiful Ind. Climbers & Shrubs 42, 1954; Chatterjee in Bull. Bot. Soc. Bengal 2:76, 1948; *Bignonia grandiflora* Thunb. Fl. Jap. 253, 1784; *Tecoma grandiflora* Loisel. Herb. Amat. 5, t. 286, 1821.

An extensive deciduous climber with few or no aerial roots. Stems somewhat angled, smooth, glabrous. Leaves opposite, compound, odd pinnate. Leaflets petioled, often unequal-sided at the base, 2.5-5 cm long, ovate, ovate-oblong or lanceolate acuminate, coarsely toothed, glabrous. Flowers large in terminal pendulous racemose panicles. Calyx campanulate, divided almost to the middle into 5 lanceolate lobes, acute. Corolla up to 5 cm long, shorter and broader than that of *Campsis radicans*, scarlet

or orange, terminating in 5 spreading lobes. Stamens 4, didynamous, included. Ovary seated in a disk; style filiform. Fruit a capsule, not beaked.

Widely cultivated in gardens for its large orange or scarlet flowers.

Fl. Hot & rainy season. *Fr.* Nov.-Dec.

Distribution :—Indigenous to China and Japan, now widely cultivated in the tropical and sub-tropical parts of the world.

Campsis radicans (Linn.) Seem. (= *Tecoma radicans* Juss. ex Spreng.) is also cultivated in gardens.

Jacaranda mimosaefolia D. Don in Bot. Reg. t. 631, 1822 & Edinb. N. Phil. Journ. 9:266, 1823; Sandwith in Kew. Bull. 456, 1953; Blatt. & Mill. Beaut. Ind. Trees 106, t. 22, 1936; Chatterjee in Bull. Bot. Soc. Beng. 77, 1948; *Jacaranda ovalifolia* R. Br. in Bot. Reg. t. 2327, 1822; Merr. Enum. 3:444, 1925; *Jacaranda acutifolia* auct. (non Humb. & Bonpl.).

A small or medium-sized tree with grey-white to dull black bark. Leaves bipinnate, 18-30 cm long, mimosa-like, rachis grooved above. Pinnae 20 pairs or less, usually opposite. Leaflets 5-26 pairs and an end one, oblong, narrowed at both ends, cuspidate, the terminal larger, linear-lanceolate. Flowers in lax pyramidal panicles, over 2.5 cm across, mauve-blue. Calyx 5-toothed; corolla-tube curved, throat wide, limb 2-lipped; lobes 5, nearly equal; stamens 4, included; staminode very long, clavately thickened and hairy at top. Capsule ovate, orbicular 7.5 × 2.5 cm compressed at right angles to the septum, loculicidally dehiscent. Seeds winged.

Frequently planted in gardens, at railway stations etc. The tree when in full bloom in April presents a beautiful sight.

Fl. March-May.

Distribution :—Indigenous to Brazil & Argentina.

Van Steenis (Bull. Jard. Bot. Buitenzorg 10:270, 1921) has confused this plant with *J. acutifolia* Humb. & Bonp. & treated *J. mimosaefolia* D. Don, as a synonym. The latter can be distinguished from *J. acutifolia* by its larger number of pinnae (16-20 pairs as compared to 6-8 pairs of *J. acutifolia* Humb. & Bonpl.).

Parmentiera cerifera Seem. Bot. Voy. Herald. 182, t. 32, 1853; Haines Bot. Bih. & Or. 659, 1924; Benthall Trees Calc. 344, 1933; Backer & Bakh. f. Fl. Java 2:542, 1965; Maheshwari Fl. Delhi 257, 1963.

A small, pretty tree. Leaves opposite, trifoliate, 7.5 cm long, leaflets obovate, elliptic, acute, petioles narrowly winged. Flowers solitary or in few-flowered fascicles whitish or pale pink, pretty, on trunk and old branches. Calyx spathaceous. Corolla campanulate, lobes spreading, about 5 cm across; stamens 4, didynamous included; staminode small; ovary sessile. Fruit cylindrical, smooth, whitish, pendulous, up to 70 cm long, closely resembling an old fashioned tallow candle (and hence the English name 'Candle Tree'), indehiscent. Seeds small, wingless. The flowers expand in the evening; the next morning the corolla falls off, unfaded.

Grown in hedges of gardens as a curiosity (as in Delhi) and several other parts.

Fl. Rainy season. *Fr.* Cold season but remain hanging on the tree for a very long time.

Distribution :—Native of Panama & Mexico, now grown in many tropical countries.

The correct spelling is *cerifera* not *cereifera* as usually given in various Indian books & floras.

Tabaebuia pentaphylla (Linn.) Hemsl. in Biol. Centr. Amer. Bot. 2:495, 1882; *Bignonia pentaphylla* Linn. Sp. Pl. 870, 1762; *Tecoma pentaphylla* Juss. Gen. 139, 1789.

A medium-sized tree, branching from near the ground. Leaves digitately compound, 3-5-foliate. Leaflets ovate-oblong, entire, 9-18 × 6-9 cm. Flowers rosy-pink, showy, funnel-shaped, in terminal clusters when the shoots become leafless.

Planted in lawns and gardens; when in flower it is a very handsome tree.

Fl. Dec.-March. Does not set fruit in this country.

Distribution :—Native of Panama, now commonly cultivated in all tropical countries.

Tecomaria capensis (Thunb.) Spach. Hist. Veg. Phan. 9: 137, 1840; Chatterjee Bull. Bot. Soc. Beng. 2: 79, 1948; Bailey, Man. Cult., Pl. 908, 1949; Backer & Bakh.f. Java 2: 538, 1965; *Bignonia capensis* Thunb. Prodr. Pl. Cap. 105, 1800; *Tecoma capensis* Lindl. Bot. Reg.t., 117, 1828; Bor & Raizada, Beautiful Ind. Clim. & Shrubs 39-40, 1954.

A rambling shrub about 2 dm high. Leaves opposite, odd pinnate; leaflets 5-9, broad ovate, serrate, shortly petioled. Flowers orange-red or flame-coloured in peduncled terminal racemes, 2.5 cm across. Calyx gamosepalous with 5 regular

triangular teeth. Corolla tubular or funnel-shaped, slightly curved, ending in 4 lobes, the upper notched. Stamens exserted. Ovary oblong, seated in a cup-like disk; style long, exserted ending in two stigmatic plates. Fruit a capsule, usually 5 cm but occasionally up to 10 cm long.

Frequently grown in gardens.

Fl. & Fr. Summer and rainy season.

Distribution:—Indigenous to the Cape, South Africa, cultivated as an ornamental in gardens throughout India.

PEDALIACEAE

Sesamum mulayanum Nair in Bull. Bot. Surv. Ind. 5(3&4): 251-253, 1963.

A strongly smelling annual 0.5 to 3, rarely up to 4 m high, often branched. Stems and branches in their upper part quadrangular with furrowed sides, pubescent becoming glabrescent, rarely pilose, usually more or less glandular. Leaves very variable often heteromorphic, opposite or upper usually alternate, thinly pubescent to glabrous above, glandular below, thinly pubescent on the prominent nerves becoming glabrescent; lower leaves long petioled, petiole 2 to 12 cm usually palmately 3-foliate, 3-lobed or 3-partite, in feeble ones undivided, ovate from a rounded or obtuse base, acute obtuse or rounded. coarsely dentate serrate; higher leaves gradually shorter petioled 0.75 to 2.5 cm, more or less ovate-oblong-lanceolate or even linear from an acute base, entire, acute. Flower solitary in the axils of higher leaves; pedicel short 0.2 to 0.5 cm long, with 2 sessile yellow glands each in the axil of a bract, erecto-patent. Calyx persistent 0.4-0.75 cm, in fruit thickened and obconical, segments oblong to lanceolate, acute or rather obtuse, pubescent. Corolla 2.25 to 3.5 cm, pink or pinkish white, pubescent, obliquely campanulate. Stamens 4, epipetalous, didynamous. Filaments glabrous arising from a mild band of hairs, 0.6 to 0.9 cm long; anthers 0.3 to 0.35 cm long, dorsifixed, glabrous, connective prolonged and terminating in a globose gland; staminodes minute or wanting. Disc at the base of the ovary annular, regular. Ovary slightly compressed 0.4 cm long, more or less rounded at the apex, pilose 2-locular becoming 4-locular due to parietal radial false dissepiment, each compartment containing many 1-seriate superposed ovules; style glabrous, with 0.8 to 1.2 cm long; stigmatic lamellae lanceolate, acute. Capsule erect, oblong, quadrangular, 4-grooved, rounded at the base, acuminate into a beak at the apex, 2 to 2.5 cm long, 0.6 cm broad, pubescent to pilose, finally splitting down to the base; beak 0.3 to 0.5 cm long. Seeds brownish

black, broadly ovate, 0.2 to 0.25 cm long, faces conspicuously rugose, side broad, transversely or reticulately rugose.

The type of this new species was collected at Kanara (Dadri) in Mahendragarh District, Punjab State, at an altitude of about 250 m by *N. C. Nair* 25127 A; and *N. C. Nair* 25127 B-E (isotype) and *N. C. Nair* 25132 A-E, 25137. A-C. 25146 A-E, collected from the same locality on the same day are deposited in the Herbarium of Botanical Survey of India, Northern Circle, Dehra Dun (BSD); New Forest, Dehra Dun *H. B. Naithani* 2442. (DD).

This species according to Nair (loc. cit.) comes near the African species *Sesamum angustifolium* Engl. in many respects such as (1) general character of the plant (2) nature of the upper leaves and pubescence (3) the nature of reticulations and thick sides of the seeds. The new species differs from it in (1) long petioled, often trifoliate, tripartite or trilobed, and often dentate lower leaves (2) glabrous anthers (3) shorter filaments (4) less pubescent ovary (5) shorter style (6) fruit (7) larger seeds. In the toothed and lobulate or trifoliate lower leaves and thick sides of the seeds the species approaches *S. radiatum* Schum., but differs in the length of the capsule beak (beak short in *S. radiatum*) and in the nature of reticulation in seeds (seeds radially rugose in *S. radiatum*). From *S. indicum* the taxon differs in the nature of pods (pods abruptly and shortly beaked at the apex in *S. indicum*) and seeds (seeds smooth in *S. indicum*).

Recently, Nair (loc. cit.) described *S. mulayanum* as a new species, based on reticulate-rugose seeds, a character according to him, that distinguished from *S. orientale* Linn., which has generally smooth seeds or often rugose seeds. (Vide, Heine in Fl. West Trop. Afr. 2: 380, 1963). A critical examination of the type material of *S. mulayanum* Nair shows that it is only a seed variant of *S. orientale* Linn., in which the seeds vary from smooth to reticulate. It may be pointed that *S. mulayanum* appears to be somewhat intermediate between *S. orientale* and *S. radiatum* Schumach.

Bakhuizen f. Fl. Java 2: 544, 1965, pointed out that Graham (Cat. Pl. Bombay, 126, 1839) was the first to unite both *S. indicum* Linn. and *S. orientale* Linn., under the latter name. Hence, according to Art. 57 of ICBN (1972) the correct name for this taxon should be *S. orientale* Linn.

ACANTHACEAE

Blepharis asperrima Nees in DC. Prodr. 11: 267, 1847; Clarke in Hk.f. FBI. 4: 478, 1884; Santapau in Univ. Bomb.

Bot. Mem. 2:14, 1951; Mukherjee in Journ. Bom. Nat. Hist. Soc. 51: 457, 1951.

A herb up to 60 cm high. Leaves 5 cm long, 2.8 cm wide, base rounded or obtuse, petiolate about 1.4 cm long, setulose. Heads terminal, few-flowered; outer most bracts leafy. Calyx green and white-nerved, glabrous thinly ciliate or setulose. Corolla blue up to 2.5 cm. Stamens 4, didynamous. Capsule about 1.4 cm, oblong. Seeds compressed, ovate, closely echinate.

The Ridge, Delhi, *Mukherjee*. Rare.

Fl. Dec.-Jan.

Distribution :—West Deccan Peninsula, Concan & Kanara.

Crossandra infundibuliformis (Linn.) Nees in Wall. Pl. Asiat. Rar. 3:98, 1832 and DC. Prodr. 11:280, 1847; G. Lindau in Pfam. 4(3B): 319, 1895; Santapau in Univ. Bom. Bot. Mem. 2:55, 1951; Backer & Bakh. f. Fl. Java 2:555, 1965; *Justicia infundibuliformis* Linn. Sp. Pl. 21, 1753; *Crossandra undulaefolia* Salis. Parad. Loud. t. 12, 1805; Clarke in Hk. f. FBI. 4:492, 1884.

A pretty undershrub up to 1 m high, nearly glabrous. Leaves 4 in a whorl, each 7-15 × 2.5-5 cm, lanceolate, acute, glabrous, shining, narrowed into the petiole. Flowers orange-yellow, pubescent outside, numerous, in axillary, often long-pedunculate, quadrangular, narrow spikes, which are 7-15 cm long. Bracts and bracteoles glandular-pubescent. Capsules 1.5 cm long, sub-acute, glabrous.

Fl. Aug.-Feb.

Distribution :—Deccan Peninsula of India; Ceylon; often planted in gardens & near temples for its flowers.

Dipteracanthus beddomei (Cl.) Sant. in Ind. For. 79:322, 1953; Babu in Bull. Bot. Surv. Ind. 8(2): 201, 1966; *Ruellia beddomei* Cl. in Hk. f. FBI. 4:413, 1884.

An erect, multicauline simple or sparingly branched, perennial herb with a woody base. Roots fleshy, fasciculated. Stems 4-gonous, glabrous downwards, appressed, hairy towards the apex. Leaves ovate-elliptic or lanceolate-oblong, with a slightly oblique, acute or rounded base, often decurrent, sharply acute or acuminate, sub-entire-undulate, ciliate, appressed-setose. 10-15 × 3.5-5.5 cm, with 6-7 (-8) pairs of lateral nerves; petiole, 2-3 cm long. Flowers on 0.3-0.5 cm long pedicels, bracteoles on 0.6-0.8 cm long stalks, leaf-like, ovate, subacute 3.5-4 × 1.3-1.5 cm; calyx 0.7-0.8 (-1) cm long, segments linear-lanceolate, ciliate; corolla pale-purple, hairy outside, about 8 cm long, lobes

oblong, obtuse 1.8-2 cm long; style ciliate; capsule 2.2-2.5 cm long; retinacula 0.3-0.4 cm long.

This species is closely allied to *D. suffruticosus* (Roxb.) Voigt, but is easily recognizable by sharply acute leaf-apex, longer calyx and larger corolla.

Rispana, Dehra Dun C.R. Babu 35456; Dehra Dun, Raizada. Rare in shaded, dry localities of forest-clearings.

Fl. & Fr. Oct.-Dec.

Distribution :—Central India, Orissa & Uttar Pradesh.

Hemiadelphis polysperma (Roxb.) Nees in Wall. Pl. As. Rar. 3:80, 1832. var. *joshianus* Rao & Biswas in Ind. For. 94(9): 657, 1968.

This is very closely allied to *Hemiadelphis polysperma* var. *polysperma* but differs in its slender habit, with smaller leaves and in having axillary and solitary flowers forming lax interrupted spikes. Staminodes are prominent and always present in the typical variety but in this variety they are very minute and often absent.

Chandmari, Varanasi Dist. S.P. Singh 2558.

Distribution :—Uttar Pradesh.

A critical study of the type of *H. polysperma* var. *joshianus* Rao & Biswas shows that it is merely an ecological variant having slender stems, shorter leaves and lax, interrupted spikes of the type.

Hygrophila difformis (Linn. f.) Sreemadhavan et Bennet in Bull. Bot. Surv. Ind. 10(2):222, 1968; *Ruellia difformis* Linn. Suppl. 289, 1781; *Cardanthera difformis* (Linn. f.) Druce in Rep. Bot. Exch. Cl. Brit. Isles Suppl. 11:612, 1917; Subramanyam, Bot. Monogr. 3:39, 1962 (CSIR); *Andenosma triflora* Nees in Wall. Pl. As. Rar. 3:79, 1832 & in DC. Prod. 11:68, 1847; *Ruellia triflora* Roxb. [Hort. Beng. 64, 1814 (nomen)] Fl. Ind. 3, 1832; *Cardanthera triflora* (Roxb.) Buchan. ex Voigt, Hort. Suburb. Calc. 482, 1845; Clarke in Hook. f. 1. Brit. Ind. 4:405, 1884; *Synnema triflorum* (Roxb.) O. Ktze. Rev. Gen. Pl. 2:500, 1891; Dixit & Singh in Ind. For. 94 (10):769, 1968.

An annual, aromatic, decumbent herb, rooting at base. Stem obtusely quadrangular, swollen at the nodes, hairy and green. Leaves opposite, exstipulate, petiole subsessile, ovate or lanceolate, apex rounded or acute, base cuneate, surface hairy, lower leaves pinnatifid, upper crenate-serrate. Flowers subsessile, bracteate, 1-3-nate in the axils of upper leaves; bracts 0.76 cm ovate; bracteoles 0.5 cm; calyx glandular, valvate, persistent,

acute, green with distinct mid-vein. Corolla 1.2 cm long, purple, bilabiate; upper lip with 2 oblong-obtuse lobes; lower lip equally 3-lobed with transversely plaited palate. Stamens 4, fertile, epipetalous, didynamous; anther lobes parallel, sagittate, violet, mucous at base. Ovary narrow, 2-celled, ovules many, style slender, sparsely hairy. Capsule narrow, sessile, 1.27 cm long; seeds many, ovoid, small; retinacula minute, conical, straight.

Tura Nala, Ramgarh Forest, Gorakhpur, S.K. Singh 511.

Fl. & Fr. Nov.-March.

Distribution :—Bengal, Assam, Bihar.

Hygrophila pinnatifida (Dalz.) Sreemadhavan in Bull. Bot. Sur. Ind. 10(2):222, 1968; O. Kuntze Gen. Pl. 2:500 1891; Heine in Kew Bull. 16:177 et seq. 1962. *Nomaphila pinnatifida* Dalz. in Kew Journ. Bot. 3:38, 1851; *Adenosma pinnatifidum* (Dalz.) T. Anders. in Journ. Linn. Soc. 9:445, 1867; *Cardanthera pinnatifida* Benth. in Gen. Pl. 2:1074, 1875; Clarke in Hk. f. FBI. 4:405, 1884; Dixit & Siddiqui in Ind. For. 92(12) : 739, 1966.

A slender, glandular pubescent aromatic herb up to 72 cm high. Stem obtusely 4-gonous, glandular-pubescent and swollen at nodes. Leaves 10-20 × 1.2-2.5 cm, oblong-lanceolate, sub-obtuse or acute, glandular-pubescent, deeply pinnatifid; flowers solitary in opposite axils or in lax spikes; bracts 0.8-1 cm long, elliptic-oblong, glandular pubescent, often with a serrate tooth at apex. Calyx about 8 mm long, divided to the base or nearly so; sepals narrow, linear, sub-spathulate, ciliate; corolla purple about 1.2 cm long, 2-lipped, upper lip with 2 oblong-obtuse lobes, lower equally 3-lobed, bullate. Stamens 4, didynamous. Ovary narrow, 2-celled, glabrous. Seeds small, ovoid.

Pakharbinda village, Gorakhpur dist., Dixit & Siddiqui.

Fl. Jan.-March.

Distribution :—W. Deccan Peninsula, Concan and North Kanara.

Justicia heterocarpa T. Anders. in Journ. Linn. Soc. 7:41, 1864; Clarke in Hk. f. FBI. 4:531, 1885; Raizada & Sharma in Ind. For. 77(5) : 365, 1962.

Annual herb. Stem 2-4 cm high or when scandent attaining even 1 m. Leaves ovate or ovate-lanceolate, membranous; lamina 1.7 × 0.5 cm; petiole 0.5 cm, very slender. Flowers sessile, few, in axillary clusters. Corolla blue. Capsules distinctly dimorphous in a axil; normal ellipsoidal, acutely beaked at apex, 2-celled, each cell with two tuberculate glabrous brown seeds; the abnormal ones with deeply dissected 6 or sometimes

less vertical wings, the teeth more or less like awns and tretrosely barbellate; seeds solitary in a cell, glabrous, angled and distinctly bigger than those of the normal capsules.

Ajmer District : Puch Kund, *Sharma* 403; Nagpahar, *Sharma* 983; Taragarh Mt., *Sharma* 1194; Taragarh, *Sharma* 1803.

Justicia prostrata (Cl.) Gamble in Fl. Madras 2(6) : 1081, 1924; Santapau in Univ. Bomb. Bot. Mem. 2:88, 1951; Ramamorthy in Bull. Bot. Surv. Ind. 5(3 & 4) : 264, 1963; Subramanian in Ind. For. 92(3) : 46, 1966; Naresh Bahadur et al. in Journ. Bom. Nat. Hist. Soc. 70(3) : 497, 1970; *Justicia diffusa* Willd. var *prostrata* Clarke in Hk. f. FBI. 4:538, 1885.

A herb; stems prostrate, intricately branched from a stout root-stock sometimes almost woody, patently hairy. Leaves smaller, often obtuse or articulate up to 1 cm long; bracts and sepals shorter broader rather more scarious; spikes slender, sparsely hairy, 2.5-5 cm by about 1 cm. Flowers pink, the capsules small and minutely puberulous, the seeds minutely tuberculate.

Bijnor, Y. K. Sarin 5133; Mirzapur town, U. C. Bhattacharya 12849; Lachiwala, Dehra Dun, M.A. Rau 13995; Mahoba, Hamirpur, U. C. Bhattacharya 17795; Sahawar, Dist. Etah, R. Dayal 5a-d; Sikandra, Agra, Jameson (Aug. 1841); Agra, Raizada s.n.

Fl. & Fr. Cold season. (practically throughout the year).

Distribution:—West Bengal, Andhra Pradesh, Tamil Nadu, Maharashtra, Kerala extending up to Ceylon.

Justicia vahlii Roth Nov. Pl. Sp. 14, 1821; Santapau in Univ. Bom. Bot. Mem. 2:88, 1951. *Justicia diffusa* Willd. var. *vahlii* Clarke in Hk. f. FBI. 4 : 538, 1885.

An erect or suberect herb from a stout root stock, sometimes straggling. Leaves 3-7 × 0.8-1.2 cm, narrowly lanceolate or linear, the lower ones sometimes ovate. Flowers pale with a reddish lip, in long spikes. Capsule 0.4-0.5 cm long, grooved on the back, glabrous. Seeds papillose.

I have included this species on the authority of M.A. Rau (Bull. Bot. Surv. Ind. Suppl. 2:69, 1968/1969). I have, however, not seen any authentic specimen of this species from the Upper Gangetic Plain, either in the Dehra Dun Herbarium or in the Herbarium of the Botanical Survey of India, Northern Circle, Dehra Dun.

Fl. May-Sept. Fr. May-Oct.

Distribution :—Peninsular India, Ceylon.

Peristrophe speciosa (Roxb.) Nees in Wall. Pl. As. Rar. 3:113, 1832; Clarke in Hk. f. FBI. 4:556, 1885; Raizada in Journ. Ind. Bot. Soc. 15(2) : 165, 1936; *Justicia speciosa* Roxb. Fl. Ind. (ed. 1) 1:122, 1820.

A herb 30-60 cm high. Leaves ovate-lanceolate or elliptic, entire, acute. Floral leaves smaller. Flowers in panicked clusters. Bracts linear-oblong, subobtus, sometimes stipulate, unequal, 8-11 mm long; corolla deep pink, 3-4 cm long, 2-lipped; stamens 2, much exceeding the tube. Style longer than the stamens.

Dehra Dun Gamble 24567; near Lachiwala, Dehra Dun Dist. B. L. Gupta Dehra Dun Herb. No. 20223; Gerjea, Ramnagar Division. U.P. A.E. Osmaston 1185; Robber's Cave, Dehra Dun, Raizada s. n.; New Forest, Dehra Dun, H. B. Naithani.

Distribution :—Himalaya up to 1500 m, from Kumaon to Bhutan.

Pseudaechmanthera glutinosa (Nees) Bremek. in Verh. Neeerl. Akad. Wet. 41:118, 1944. *Strobilanthes glutinosus* Nees, in Wall. Pl. As. Rar. 3:86, 1832 and in DC. Prodr. 11:194, 1847; Clarke in Hk. f. FBI. 4:458. 1884.

A small viscous-hairy erect or suberect shrub, 0.3-1 m high. Leaves elliptic, acuminate, narrow to the base, crenate-serrate. Flowers in short capitate spikes, often interrupted. Bracts leaflike, ovate, persistent. Bracteoles ligulate, 5 mm long. Sepals linear, obtuse, 10-15 mm long, 1.5-2 mm wide, glandular-hairy. Corolla purple, tubular-ventricose, about 5 cm long, 3 cm across. Capsule viscous-hairy.

Dehra Dun Raizada s.n., Gamble 24541.

Fl. March-Oct. Fr. Feb.-April.

Distribution :—Western Himalaya, 900-1800 m.

Rostellularia Reichb. f.

The genus *Rostellularia* proposed by Reichenback (Hand. 190, 1837) was formerly included under the genus *Justicia* Linn. (1753; 1754) sensu lato, but is now generally treated as a distinct genus.

The earliest generic name *Rostellaria* Nees (1832) for this group of plants is illegitimate, as it is a later homonym of *Rostellaria* Gaertn. (1805). Hence Reichb. f. loc. cit. proposed the above generic name for this taxon. Later, this was adopted by Nees (in DC. Prodr. 11 : 370, 1847).

The following two species of this genus occur in our area:

Rostellularia mollissima (Nees) Nees in DC. Prodr. 11:373, 1847; *Rostellaria mollissima* Nees in Wall. Pl. As. Rar. 3: 101, 1832; *Justicia simplex* D. Don Prodr. 118, 1825 (non *Rostellularia simplex* Wt. 1850); Hk. f. FBI. 4: 539, 1884; Duthie Fl. UG. Plain 2: 210, 1911.

Rostellularia mollissima (Nees) Nees var. *serpyllifolia* (Cl.) Raizada comb. nov. (= *J. simplex* D. Don var. *serpyllifolia* Cl. in Hk. f. FBI. 4: 539, 1885) seems to be a dwarf form of the type.

From the above synonymy, it is evident that the oldest binomial for this plant is *J. simplex* D. Don but the specific epithet, '*simplex*' is not available under the genus *Rostellularia* Rechb. f., as it is preoccupied by *R. simplex* Wt. The author, therefore, proposes *R. mollissima* Nees, one of the valid, legitimate synonymous plant cited by Clarke (loc. cit.), as the correct name for this plant.

Rostellularia quinqueangularis (Koen. ex Roxb.) Nees in DC. Prodr. 11: 375, 1847. var. *peplodes* (Nees) Raizada com. nov.; *Rostellaria peplodes* Nees in Wall. Pl. As. Rar. 3:101, 1832. *Rostellularia peplodes* (Nees) Nees in DC. Prodr. 11: 375, 1847; *Justicia quinqueangularis* var. *peplodes* (Nees) Cl. in Hk. f. FBI. 4: 537, 1885; Duthie, FUGP 2:209, 1911.

The new variety is distinguishable from the typical variety by ovate-oblong leaves, longer petioles and shorter spikes.

Rispana, Dehra Dun, C.R. Babu 33424 34728.

Ruellia tuberosa Linn. Sp. Pl. 635, 1753; Santapau in Univ. Bom. Bot. Mem. 2:23, 1951; Bremekamp in Verh. Ned. Akad. Wet. (2) 45 (1): 11, 1948 and Dansk. Botan. Arkiv. 20:64, 1961; Backer & Bakh. f. Fl. Java 2:557, 1965.

An erect herb, 20-50 cm high, sometimes branched, nearly glabrous. Leaves 5-10 cm long, ovate or elliptic acute or subacute at apex, tapering at the base and decurrent into a short petiole, undulate-crenate. Flowers blue, in axillary cymes up to 4 cm in diameter. Capsules up to 2.5 cm long, linear, more or less uniformly cylindric for most of their length.

Common and a naturalized weed along roadsides and in gardens, not found away from human habitation.

Bindal, Dehra Dun, Raizada s. n.; Employment Exchange, Dehra Dun, H.B. Naithani, Dehra Dnn Herb. No. 42487.

Fl. & Fr. Oct.-Dec.

Distribution :—Naturalized in Western India, and in other tropical countries like India, Ceylon, Java.

STEPHANOPHYSUM Pohl. (1831)

Formerly included under the genus *Ruellia* Linn. sensu lato, now generally treated as a distinct genus. (Vide, Bremekamp in Verh. Kon. Ned. Adak. Wet. A'dam Sect. 2. 45:13, 1948).

Stephanophysum longifolium Pohl, Pl. Bras. IC. 2:85, t. 156, 1813; Bremek. in Verh. Kon. Ned. Akad. Wet. A'dam. Sect. 2. 45:1. 13, 1948; Backer & Bakh. f. Fl. Java 2:558, 1965; *Ruellia longifolia* (Pohl) Griseb. ex Zindan in Pflanzenfam. 4(3b): 311, 1895 (non Rich. 1782; non Roth 1821; non J. Andr. 1867). *R. amoena* Nees ex Backer in Ann. Jard. Bot. Buitz. Ser. 2. Suppl. 1:254, 1909 (non Sesse & Moc. 1889); *R. graecizans* Backer in Brittonia 3:85, 1938.

An erect herb. Stems 4-gonous, hairy on the angles. Leaves ovate-elliptic-oblong, cuneate and contracted at base, acute or acuminate at apex, shallowly crenate, villate, glabrous or thinly hairy, 6-12 × 2.5-5 cm. Flowers in patently pubescent cymes; peduncle 5-10 cm long; pedicels 0.5-1 cm long; bracts linear-lanceolate or oblong-spathulate, ciliate, 0.4-0.5 cm long; calyx segments linear, thinly pubescent, 1-1.5 cm long. Corolla bright red, hairy without, 3-5 cm long, lobes rounded, retuse; ovary gland-hairy at the top, style hairy.

Bindal, Dehra Dun, C.R. Babu 35283, occasionally cultivated in gardens, sometimes met with as an escape in waste places, but not yet naturalized.

Fl. & Fr. July-Nov.

Distribution :—Native to Brazil.

Backer & Bakh. f. loc. cit. given Poir. as the author of *Stephanophysum longifolium*.

Staurogyne polybotrya (Nees) O. Ktze., Rev. Gen. Pl. 497, 1891; Raizada in Proc. Nat. Inst. Sci. India 24(4): 201, 1958; *Ebermaiera polybotrya* Nees in DC. Prod. 11: 74, 1847; Clarke in Hk.f. in FBI 4:396, 1884.

An erect herb like plant with erect stems 15-21 cm high, often branched from the base. Leaves all opposite, even at the base of spike, about 3 cm long by 0.8 mm, subentire, minutely pubescent on the nerves beneath or glabrous; petiole 0 or in the lower leaves 2 mm. Spikes cylindric not lax downwards; bracts narrowly oblong, scarcely exceeding the calyx; bracteoles linear. Sepals 4, subsimilar, narrow-linear, subobtuse, the fifth rather longer, much broader, oblong, obtuse. Corolla straight, slightly pubescent without, purplish with yellow or rose stripes, about

8 mm. Stamens 4, didynamous, included. Capsule small, oblong, bearing seeds from the base and near the apex.

Gorakhpur, S. K. Seth Dehra Dun Herb. No. 113553.

Fl. & Fr. Dec.-Feb.

Distribution :—Bengal, Sikkim, Bangladesh, Burma.

Thunbergia coccinea Wall. Tent. Fl. Nep. 49, 58, t. 37, 1826; D. Don Prodr. 120, 1825; Clarke in Hk.f. FBI. 4: 393, 1884; Raizada in Ind. Bot. Soc. 15: 164, 1939; Bor & Raizada in Beautiful Indian Shrubs & Climbers 111-112, 1954; Backer & Bakh.f. Fl. Java 2: 552, 1965.

An extensive climber with long pedulous branches. Leaves opposite, elliptic acuminate, toothed, palmately 3-nerved, 7.5-13 cm long, 3-6.5 cm broad, lower leaves ovate, upper oblong, obtuse cordate or angular at base; petiole 1.4-5 cm long or 0 in the uppermost leaves. Racemes elongate, pendent 15-46 cm, lax; bracts persistent, 1-2.5 cm; pedicels 0.6-3.4 cm, opposite or fascicled; bracteoles up to 2.5 cm, broadly oblong or ovate, blackish or purple. Calyx a minute rim; corolla-tube about 2.5 cm, scarlet to orange. Capsule 2.5-3.5 cm long, globose, narrowed suddenly into a flat beak, nearly glabrous.

Dehra Dun near Company Bagh, *Sohan Lal* Dehra Dun Herb. No. 20265; Tapkeshwar, Dehra Dun, *Raizada* s.n.; Kala-garh, Ramnagar division, U.P., *A.E. Osmaston* 1223.

This species is commonly cultivated in gardens and is often met with as an escape in ravines.

Fl. March-Nov.

Distribution :—Himalaya from Kumaon to Bhutan, Khasi Mountains, Assam, Burma, Ceylon.

VERBENACEAE

Callicarpa longifolia Lamk. var. *lanceolaria* Clarke in Hk. f. FBI. 4: 570, 1885; Raizada in Journ. Ind. Bot. Soc. 15: 165, 1936; P. C. Kanjilal in For. Fl. Plains Uttar Pradesh 534, 1966.

A shrub, young parts scarfy stellate. Leaves 10-14 cm long, 2.5-3.8 cm broad, narrow lanceolate, acuminate, serrulate, glandular dotted beneath. Flowers rose or purple on spreading somewhat lax cymes. Calyx glabrate, truncate, small. Corolla about 5 mm across.

Dhanava, Pilibhit, *Sri Ram* 1627; Milani, South Kheri, *Sri Ram* Dehra Dun Herb. No. 52516.

Fl. March-Aug. *Fr.* June-Sept.

Distribution:—East Bengal, Khasi & Bangladesh.

Chascanum marribifolium Fenzl. ex Walp. Rep. 4: 38, 1845; Moldenke in Fedde, Rep. Sp. Nov. Beih. 45: 135, 1938; Raizada in Ind. For. Rec. (n.s.) *Botany* 4(3): 69, 1951; Gillett in Kew Bull. 10:133, 1955; Hutchinson, Dalziel & Hepper, Fl. W. Trop. Africa 2:437, 1963. *Bouchea marrubifolia* (Fenzl.) Schauer in DC. Prodr. 11: 558, 1847; Clarke in Hk.f. FBI. 4: 564, 1885.

A herb; stem woody, much branched. Leaves 2.5×1.2 cm, coarsely toothed, hairy pubescent on both surfaces; petiole about 1.5 cm. Spikes 5-13 cm, nearly continuous; flowers alternate; bracts very smooth, lanceolate. Calyx about 0.8 cm, subtruncate, inflated in fruit. Corolla-tube very small. Stamens didynamous, included; ovary 2-celled, cells 1-2-ovuled. Fruit dry, included in the calyx, of 2 linear-oblong, black pyrenes.

Ajmer, *Brahma Dutt Tiagi*, Dehra Dun Herb. No. 10300 and 101369; Ridge, Old Delhi, *Raizada*.

Fl. & Fr. Rainy season.

Distribution:—Sindh, Arabia, Egypt, Abyssinea, Central Africa.

Clerodendrum aculeatum Griseb. Fl. Brit. West Ind. 500, 1864; Clarke in Hk.f. FBI. 4: 589, 1885.

A spiny shrub 1.5-3 cm high, base of the petiole persisting after the fall of the leaves as a short conical somewhat recurved spine. Leaves opposite, 2.9 by 1.4-2 cm, elliptic, narrowed at both ends; petiole slender, except near the base, up to 1 cm long. Flowers in few-flowered lax axillary cymes crowded towards the ends of branches, about 1 cm across. Calyx 0.4 cm long, pubescent, lobed nearly half way down; lobes ovate, acute. Corolla-tube 1.5 cm long, very slender. Stamens and styles much exserted.

Frequently cultivated in gardens and is a useful hedge plant.

Fl. July & April. *Fr.* Oct.-June.

Distribution:—Indigenous to tropical America.

Clerodendrum inerme (Linn.) Gaertn. Fruct. 1: 271, t. 57, f. 1, 1788; Clarke in Hk.f. FBI. 4: 589, 1885; Mueuse in Blumea

5: 74, 1942; Moldenke in Known Georg. Distr. 126, 1949; Bor & Raizada in Beaut. Ind. Shrubs & Climbers 146, 1954; Backer & Bakh. f. Fl. Java 2:608, 1965; *Volkoameria inermis* Linn. Sp. Pl. 6: 889, 1753.

A rambling evergreen shrub. Leaves opposite, 2.5-5 × 1.5-3 cm, elliptic or obovate-obtuse, entire, glabrous or nearly so, base narrowed; petiole 0.8-1.5 cm long. Flowers 1.2-2 cm across, white, in axillary pedunculate usually 3-7-flowered cymes. Calyx 6 mm long, with sessile glands outside, teeth minute. Corolla-tube white, 3.5-3.9 cm long, slender, glabrous without hairy within. Stamens and style much exserted, crimson; drupe 1-1.8 cm long, pyriform.

Often grown in gardens for covering embankments, walls etc.

Fl. July-April. Fr. Oct.-June.

Distribution:—India & Ceylon near the Sea from Bombay to Tenasserim extending to Polynesia.

Clorodendrum splendens G. Don, in Edinb. Phil. Journ. 11: 349, 1824; Bailey, Stand. Cycl. Hort. 1:800, 1950; Backer & Bakh.f. Fl. Java 2:611, 1965 & 3:657, 1968.

A dwarf climber. Leaves ovate-oval-oblong, from a subcordate-rounded-truncate base, acuminate, with entire, often undulate margin, shining dark green above, paler beneath, densely dotted near the base with patelliform glands, 5-18 × 3-8 cm; petiole 1-2 cm. Flowers in large close clusters of gorgeous crimson flowers.

Cultivated in gardens for its crimson showy flowers.

Fl. Cold season. Dose not set seed in the region.

Distribution:—A native of Sierra Leone.

Gmelina asiatica Linn. Sp. Pl. 626, 1753; Clarke in Hk.f. FBI. 4: 582, 1885; Duthie Fl. UGP 2: 221, 1911; Panigrahi et al Bull. Bot. Surv. Ind. 10(1): 58, 1968.

A spinous shrub; leaves small, ovate or obovate, entire or lobed, mature glabrous, 1.5-3 cm; petiole about 0.7 cm. Racemes terminal, fulvous-tomentose, 2.5-5 cm long; bracts caducous, small; calyx campanulate, tomentose, shortly 5-toothed, persistent. Corolla about 3.5 cm bright yellow, tube slender below, ventricose upwards; limb oblique 5-lobed. Stamens 4, didynamous, subexserted; ovary 4-celled, 4-ovuled; style slender, shortly bifid.

Karhal, Etawah Dist., Duthie 6609; Rajpur, Allahabad

District, *Panigrahi* 11288, along small nala near the road side, probably planted.

Fl. Rainy season.

Distribution:—Deccan Peninsula, U.P. and Bengal, Ceylon, frequently cultivated.

Duthie's record from Etawah Distt., apparently refers to the plant being wild not cultivated.

Lippia alba (Mill.) N. E. Br. ex Britton & Wilson in Sc. Surv. Porto Rico & Virgin Islands 6: 141, 1925; Moldenke in Known Geogr. Distrib. 127, 1949; *Lantana alba* Mill. Gard. Dict. (ed. 8) No. 8, 1768; *Lippia geminata* H.B.K., Nov. Gen. et Sp. 2: 266, 1818; Clarke in Hk.f. FBI. 4: 563, 1885; Raizada in Jour. Ind. Bot. Soc. 15: 165, 1936.

A straggling aromatic shrub 1-2 m high. Leaves 2.5-5 cm long, ovate, subobtusate at apex, obtuse at base and somewhat decurrent, rugose, closely crenulate or crenate-serrate. Flowers pink, scented, in dense cylindrical spikes elongating up to 3 cm in length; peduncles in one or two pairs. Fruit small, dry separating into two, 1-seeded pyrenes.

Deori Range, Saugor, *D. O. Witt* Dehra Dun Herb. No. 7189, 7190; Along the muddy banks of Gomti, Lucknow, *Raizada* s.n.; Jaunpur, *Som Deva* 4129; Monkey Bridge, Lucknow, *H.B. Naithani* Ser. II. No. 98.

Fl. & Fr. March-Oct.

Distribution:—Native of tropical America and West Indies, widely dispersed in other tropical countries. Introduced in India and elsewhere; common in Andhra Pradesh, Bihar, Orissa, W. Bengal, Assam and Andamans. According to Meeuse in Blumea 5: 68, 1942, the correct name of this species should be *Lippia javanica* (Burm. f.) Spreng. Syst. 2: 752, 1825 based on *Verbena javanica* Burm. f. Fl. Ind. 12: t. 6, f. 2, 1768.

While discussing the nomenclature of this species, Meeuse (l.c.) states "In order to solve this problem we have studied a leaf and an inflorescence of the type specimen".

The investigation proved that *Verbena javanica* belongs to the genus *Lippia* L., and that it is identical with the species commonly known as *Lippia asperifolia* A. Rich. An older synonym of the latter is *Lippia alba* (Mill.) N.E. Br., based on *Lantana alba* Mill. (1768). Now that Burman's *Verbena javanica* appears to be conspecific with Miller's *Lantana alba* the interesting question arises which specific name should be maintained, as

both species were published in the same year. We were not able to decide which publication is the older one, the only date available being 1768. Accordingly, the oldest combination based on one of these names which was made in the genus *Lippia* has priority. This appears to be *Lippia javanica* (Burm. f.) Spreng. (1825), which invalidates *Lippia alba* (Mill.) N. E. Br., (1925), though unfortunately the specific epithet on "Javanica" is quite inappropriate, for the plant does not occur in Java at all.

Premna scandens Roxb. Fl. Ind. 3: 82, 1824; Clarke in Hk.f. FBI. 4: 574, 1885; Raizada in Journ. Ind. Bot. Soc. 15: 166, 1936; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 539, 1966.

A large woody climber with pale-brown bark. Leaves 15-20 cm long, 6-12 cm broad, elliptic, elliptic-oblong or ovate, caudate, entire. Flowers greenish-white, about 4 mm across, in large spreading corymbose pubescent panicles up to 20 cm across. Calyx truncate, cupular not enlarging in fruit. Corolla about 2 mm long. Drupe obovoid (immature).

Domakhand, Gorakhpur, D.F.O. Dehra Dun Herb. No. 10117.

Fl. Oct.

Distribution :—Terai of North and East Bengal, Sikkim, Bhutan, Assam, Konkan.

Verbena bipinnatifida Schau. in DC. Prodr. 11:553, 1874; Bailey, Man. Cult. Pl. 840, 1949.

A prostrate, hirsute perennial herb with ascending stems. Leaves divided into linear divisions long-petiolate. Flowers lilac-purple, in dense heads elongating in fruits. Bracts equalling the sepals. Calyx lobes setaceous.

Cultivated in garden beds and along slopes of private roads, forming a thick carpet and beautifying the landscape; often met with as an escape in waste places near gardens, especially in Delhi, J.K. Maheshwari 241.

Fl. & Fr. Winter season.

Verbena bonariensis Linn. Sp. Pl. 29, 1753; Clarke in Hk. f. FBI. 4:565, 1885; Raizada in Journ. Ind. Bot. Soc. 15:165, 1936; Backer & Bakh. f. Fl. Java 2:596, 1965.

A perennial pubescent herb, 0.6-1.5 m high; stems 4-angled. Leaves opposite, sessile, more or less auricled, oblong, 8-12 × 1.1-5 cm nervose, toothed, or serrate. Flowers in short spikes,

arranged in dense corymbs or heads. Corolla deep purple, obliquely 5-lobed, about 5 cm long. Fruit dry, included in the calyx, separating into 4 pyrenes.

Mothronwala, Dehra Dun, Raizada s.n.; New Forest, Dehra Dun, H.B. Naithani 3505; Rispana, Dehra Dun, C.R. Babu, 35261.

Fl. & Fr. April-June.

Distribution:—A native of Brazil, now naturalized in the Himalayas and Nilgiris etc.

Vitex leucoxydon Linn. f. Suppl. 293, 1781; Clarke in Hk. f. FBI. 4:587, 1885; Raizada in Journ. Ind. Bot. Soc. 15: 166, 1935.

A small deciduous tree, young parts silky pubescent. Leaves usually 3-5-foliolate; leaflets petiolated, oblong, entire, mature woolly along the mid-rib beneath, otherwise glabrate, 2.5-8 cm long, 2.5-5 cm broad, central largest, coriaceous. Flowers fragrant, white in peduncled compound corymbiform lax dichasia 3-10 cm long. Corolla 2-lipped, about 1.4 cm long, adpressed pubescent outside. Drupe ellipsoid, about 1.7 cm long, dark-purple, seated on the accrescent calyx.

Jhansi-Rajghat along the Betwa, P.C. Kanjilal, only once collected—probably an escape.

Fl. March-April. Fr. Oct.-Nov.

Distribution:—Central Provinces, South Deccan Peninsula & Ceylon.

LABIATAE (LAMIACEAE)

Ajuga parviflora Benth. in Wall. Pl. As. Rar. 1:59, 1830; Hk. f. in FBI. 4:703, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 225, 1940; Som Deva in Bull. Bot. Surv. Ind. 10(2): 180, 1968.

A softly villous herb. Stems spreading, diffusely branched from the base. Leaves shortly stalked or sessile, ovate or oblong, 5-15 cm long, toothed or almost entire, lower surface often tinged with purple; radical leaves spreading. Flowers small about 6 mm, blue, crowded in axillary whorls forming leafy spikes; floral leaves smaller. Corolla-tube straight, hardly longer than the calyx, blue; stamens 4, in unequal pairs, included within the tube. Nutlets very small, rugosely pitted.

Sahasradhara, Dehra Dun Som Deva 2063.

Fl. March-Oct.

Distribution :—Western Himalaya, from Kashmir to Kumaon—Afghanistan.

ANISOMELES R. Br.

Rothmaler (Fedde, Repert. 53:12, 1944) considered *Anisomeles* R. Br. (Prodr. 503, 1830) as conspecific with *Epimeredi* Adans. (Fam. Pl. 2:192, 554, 1763). But Bakhuizen f. (in Fl. Java 2:624, 1965) pointed out that the specimens in Herb. Adanson (Paris) are a mixtum and do not represent *Anisomeles* R. Br. If, however, both *Anisomeles* R. Br. and *Epimeredi* Adans. are actually conspecific, as pointed out by Rothmaler, *Epimeredi* Adans. should be the correct generic name for this taxon, if the former is not conserved against it.

Anisomeles indica (Linn.) O.K. Rev. Gen. Pl. 2:502, 1891; Mukerjee in Rec. Bot. Surv. Ind. 14:152, 1940; Backer & Bakh. f. Fl. Java 2:624, 1965; *Nepeta indica* Linn. Sp. Pl. 571, 1753; *Anisomeles ovata* R. Br. in W. Ait. Hort. Kew ed. 2. 2:364, 1811; Hk. f. in FBI. 4:672, 1875; Duthie Fl. UGP. 2: 245, 1911; *Epimeredi indicus* (Linn.) Rothm. in Fedde, Repert. 53:12, 1944.

Anuragia verticillata (Benth.) Raizada Com. Nov. *Dysophylla verticillata* Benth. in Wall. Pl. As. Rar. 1.30, 1830 & Lab. Gen. & Sp. 159, 1832-36 et DC. Prodr. 12:157, 1848; Hk. f. in FBI. 4:639, 1885; Panigrahi et al. in Bull. Bot. Surv. Ind. 11(1 & 2) : 108, 1969.

An erect branched, glabrous, annual herb. Leaves 4-10 in a whorl, linear or linear lanceolate, entire or obscurely toothed, 2.5-7.5 cm long about 0.7 cm broad. Flowers in spikes 2.5-7.5 cm long, whorled, tomentose or villous. Calyx teeth stellately spreading and very conspicuous in fruit.

Nishangarha, Bahraich Distt. *Panigrahi* 6529; Bankatli range, Kiratpur block, North Kheri Division, *D.P. Raturi* 2557, a herb growing on marshy land.

Fl. & Fr. Cold season.

Distribution :—Bihar, Bengal, Bangladesh, Burma, in swamps and rice fields; Ceylon, Malaya Arch., China, Phillipines, Australia.

According to El-Gazzar & L. Watson (& Airy Shaw) in Taxon 16:186, 1967. *Dysophylla* Bl. sensu stricto is cogenetic with *Pogostemon* Desfontaines. Since *Dysophylla* El-Gazzar

& L. Watson has still not been conserved as proposed by H. K. Airy Shaw (Taxon 16:199, 1967) & *Dysophylla* Bl. (Bijdr. 826, 1826) & *Pogostemon* Desf. (Mem. Mus. Paris 2:154, t. 6, 1815) against *Alopecuro veronica* Linn. (Fl. Zeyl. 193, 1747 descr.) Amoen. Acad. 4:143, 1759 have also so far remain to be conserved as proposed and suggested by R. C. Bakhuizen van den Brink, Hsuan Keng & C.G.G.J. van Steenis in Taxon 19:820-821, 1970, I propose the generic name *Anuragia* to commemorate the name of my grandson, Anurag, who has substantially helped me in the preparation of this Supplement and in various other ways in my botanical studies.

The following transfers from *Dysophylla* to *Anuragia* become necessary and are made :

Anuragia quadrifolia (Benth.) Raizada com. nov.; *Dysophylla quadrifolia* Benth. in Wall. Pl. As. Rar. 1:30, 1830 & Lab. Gen. & Sp. 159, 1832-36 et in DC. Prodr. 12:157, 1848; Hk. f. in Fl. Br. Ind. 4: 639, 1885.

Anuragia cruciata (Benth.) Raizada com. nov.; *Dysophylla cruciata* Benth. in Wall. Pl. As. Rar. 1:30, 1830 & Lab. Gen. & Sp. 158, 1832-36 et in DC. Prodr. 12:157, 1848; Hk. f. in Fl. Br. Ind. 4:639, 1885.

Anuragia linearis (Benth.) Raizada com. nov.; *Dysophylla linearis* Benth. in DC. Prodr. 12:157, 1848; Hk. f. in Fl. Br. Ind. 4:639, 1885.

Anuragia verticillata (Benth.) Raizada com. nov.; *Dysophylla verticillata* Benth. in Wall. Pl. As. Rar. 1:30, 1830 & Lab. Gen. & Sp. 159, 1832-36 et in DC. Prodr. 12:157, 1848; Hk. f. in Fl. Br. Ind. 4:639, 1885; Panigrahi et al in Bull. Bot. Srv. Ind. 11(1 & 2) : 108, 1969.

Anuragia crassicaulis (Benth.) Raizada com. nov.; *Dysophylla crassicaulis* Benth. in Wall. Pl. As. Rar. 1:30, 1830 & Lab. Gen. & Sp. 159, 1832-36 et in DC. Prodr. 12:158, 1848; Hk. f. in Fl. Br. Ind. 4:140, 1885.

Anuragia helferi (Hook. f.) Raizada com. nov.; *Dysophylla helferi* Hook. f. in Fl. Br. Ind. 4:640, 1885.

Anuragia stellata (Benth.) Raizada com. nov.; *Dysophylla stellata* Benth. in Wall. Pl. As. Rar. 1:30, 1830 & Lab. Gen. & Sp. 159, 1832-36, et in DC. (Prodr. 12:158, 1848; Hk. f. in Fl. Br. Ind. 4:640, 1885; Dalz. & Gib. Bom. Fl. 209, 1861; Cooke Fl. Bomb. 2:457, 1906; Gamble Fl. Madr. 1137, 1921; Mukerjee in Rec. Bot. Surv. Ind. 14(1):58, 1940.

Anuragia tomentosa (Dalz.) Raizada com. nov.; *Dysophylla tomentosa* Dalz. in Hook. Kew. Journ. 2:337, 1850.

Anuragia gracilis (Dalz.) Raizada com. nov.; *Dysophylla gracilis* Dalz. in Hook. Kew. Journ. 2:377, 1850.

Anuragia erecta (Dalz.) Raizada com. nov.; *Dysophylla erecta* Dalz. in Hook. Kew. Journ. 2:337, 1850; Hk. f. in Fl. Br. Ind. 4:641, 1885.

Anuragia pentagona (Cl. ex Hk. f.) Raizada com. nov.; *Dysophylla pentagona* Clarke ex Hk. f. in Fl. Br. Ind. 4:641, 1885.

Anuragia griffithii (Hook. f.) Raizada com. nov.; *Dysophylla griffithii* Hook. f. in Fl. Br. Ind. 4:641, 1885.

Anuragia stocksii (Hook. f.) Raizada com. nov.; *Dysophylla stocksii* Hook. f. in Fl. Br. Ind. 4: 642, 1885.

In *Dysophylla* two groups of plants may be distinguished, one with opposite leaves (*Dysophylla* Bl. sensu stricto) the other with verticillate leaves; for accomodating the latter, Rafinesque (Fl. Tell. 2:75, 1836) created the genus *Eusteralis* which apparently was overlooked by El-Gazzar & Watson and Airy Shaw when they proposed the name *Dysophylla* El-Gazzar & Watson. However Rafinesque's genus *Eusteralis* though probably, has priority it has not been used in any taxonomic literature ever since its creation in 1836. The acceptance of this hitherto forgotten and absolute generic name in my opinion is now unnecessary and superfluous and hence I propose the new generic name *Anuragia*.

Coleus forskohlii (Poir.) Briq. in Engl. & Prantl, Pflanzenfam. 4 (3a): 358, 1897; Mukerjee in Rec. Bot. Surv. Ind 14(1): 53, 1940; *Germania forskohlii* Poir. Dict. 2: 764, 1811; *Plectranthus forskohlii* Willd. Sp. Pl. 3: 169, 1800 non Vahl 1790; *Coleus barbatus* Benth. in Wall. Pl. As. Rar. 2: 15, 1830; Hk.f. in FBI. 4: 625, 1885; Som Deva in Bull. Bot. Surv. Ind. 10(2): 180, 1968.

A perennial herb, 30-60 cm high; stem stout, villous with long hairs; leaves short petioled, ovate or obovate, villous or hispid; lamina 4-7 cm long, crenate. Flowers in whorls of 6-8, forming long interrupted spike-like racemes. Bracts about 2.5 cm long, deciduous. Calyx 2-lipped. Corolla bluish, tube deflexed at right-angle, longer than the calyx, limb 2-lipped, upper lip short, reflexed, 4-lobed; lower boat-shaped. entire, much longer than the upper. Stamens 4, filaments combined below into a sheath around the style.

Sahasradhara, *Raizada*, in dry rocks; *Som Deva* 2869.

Fl. & Fr. Sept.-Nov.

Distribution.—Subtropical Himalaya from Simla to Nepal, 600-2100 m, Bihar, S. India, Ceylon, Tropical E. Africa.

Craniotome furcata (Link.) O. Ktze. Rev. Gen. 516, 1891; Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1&2): 40, 1970; *Ajuga furcata* Link. Enum. 2: 99, 1822; *Craniotome versicolor* Reich. IC. Exot. 1: 39, 1824; Mukerjee in Rec. Bot. Surv. Ind. 14: 151, 1940; Hk.f. in FBI. 4: 672, 1885; Collett, in Fl. Sim. 401, t. 120, 1902.

An erect softly hirsute herb, 30-90 cm high. Leaves long petiolate, broadly ovate, lamina 4-10 cm long, cordate, crenate or toothed. Flowers numerous, crowded in small, somewhat subsecund cymes, forming terminal panicles. Corolla pink-white, tube exserted, upper lip very short, erect, hood-like, lower longer, spreading, 3-lobed.

Sahasradhara, along moist rocky slopes, S.K. Malhotra 30707.

Fl. & Fr. Sept.-Oct.

Distribution.—Temperate Himalaya, 1500-2300 m; Khasi Mts., China, Indo-China.

This species is fairly common along way sides and in forest undergrowth, 1500-2300 m in Mussoorie, Barlowganj, Kincaig, Depot, Jabarkhet Road, etc. I greatly doubt if the specimen was collected from the base of Sahasradhara; almost certainly it must have come from above 1000 m.

Hyptis suaveolens (Linn.) Poit. in Ann. Mus. Paris 7: 472, t. 29, f. 5, 1836; Hk.f. in FBI. 4: 630, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 63, 1940; Raizada in Ind. For Rec. (n.s.) Botany 4(3): 70, 1950; Backer & Bakh. f. Fl. Java 2: 634, 1965; *Ballota suaveolens* Linn. Syst. (ed. 10) 1100, 1759.

A tall, sweet smelling rigid herb, 1-3 m high with tetragonal hispid stems. Leaves petiolate, very variable in size, 2.5-11 cm long, ovate, cordate, denticulate, pubescent, villous on both sides. Flowers blue, secund in short umbels, axillary or terminal sometimes in panicles. Nutlets generally 2, blackish-brown, notched on apex and with a white mark on either side of pointed base, 4 cm long; fruiting calyx 1-1.3 cm long.

Robber's Cave, Dehra Dun, Raizada Dehra Dun Herb. No. 78933; Benares, Raizada Dehra Dun Herb. No. 94890; on waste ground near Carlton Hotel, Lucknow, Patil 480; Hartala Colony, Moradabad, H. B. Naithani Dehra Dun Herb. No. 148842.

Fl. & Fr. April-Dec.

Distribution:—Native of Tropical America, introduced in India, Africa, Malaya, Siam, Indo-China, Philippines, Formosa and other tropical countries.

Lamium amplexicaule Linn. Sp. Pl. 579, 1753; Hk.f. in FBI. 4:679, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 160, 1940.

A decumbent, much branched perennial herb, 10-30 cm high. Leaves all stalked, cordate, ovate, 4×7.5 cm, coarsely and sharply toothed. Flowers in axillary whorls up to 2.5 cm long, white or pale pink. Calyx-teeth longer than tube, spreading in fruit. Lateral lobes of corolla narrow, reflexed, sometimes furnished with a small tooth.

Tapkeshwar, Dehra Dun, *Raizada* s.n., weed in fields; Rest Camp, Dehra Dun *H.B. Naithani* 1501 & 7500; Hardwar Road, Dehra Dun, *Som Deva* 1817, weed in vegetable fields; Dhola Nala near Saharanpur, *Som Deva*, weed in wheat fields.

Fl. April-July.

Distribution:—Punjab, Western temperate Himalaya, North and West Asia, N. Africa, Europe.

Leucas clarkei Hk. f. in FBI. 4:688, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1):171, 1940; Bhattacharya in Bull. Bot. Surv. Ind. 5:60, 1963.

A slender sparsely appressedly pubescent annual, 30-60 cm high, branches ascending, scabrid, 4-gonous; leaves long petioled, 2.5-5 cm, ovate-cordate, obtuse, linear or linear lanceolate, entire or subserrate. Whorls terminal, globose up to 20 cm long, 2.5 cm across. Calyx short, pubescent, turbinate, teeth very slender, 3 upper much the longest. mouth laxly hairy. Corolla-tube included, upper lip short, lower about 1 cm long, widely spreading, bluish white, decurved. Nutlets dull brown, dotted.

Mirzapur, common in cultivated fields around Robertsganj, *Bhattacharya* 17701, fairly common.

Fl. & Fr. Aug.-Oct.

Distribution:—Simla to Sikkim at 1750 m, Khasi hills, Central India, Concan. Deccan, Bihar.

Leucas diffusa Benth. Lab. Gen. et. Sp. 615, 1832; Hk. f. in FBI. 4:689, 1885; Briq. in Engl. & Prantl. Naturl. Pflanzenfam. 4(3a): 252, 1896; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 171, 1940.

A slender diffuse herb, with trailing branches, hispid or hirsute. Leaves sessile, 1.5-3.5 cm long, linear or linear-oblong,

obtuse at apex, narrowed at base, subentire, hispid and bristly above, tomentose beneath. Flowers white in solitary and terminal few-flowered whorls. Bracts slender, ciliate, shorter than calyx. Nutlets rounded at top, smooth.

The Ridge, Delhi, Mukerjee.

Fl. & Fr. July-Jan.

Distribution :—Deccan Peninsula.

Leucas martinicensis (Sw.) R. Br. Prodr. 504, 1810; Hk. f. in FBI. 4:688, 1885; Briq. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3a) : 252, 1896; Mukerjee in Rec. Bot. Surv. Ind. 14(1) : 169, 1940; Raizada & Sharma in Ind. For. 88(5) : 366, 1962; *Phlomis martinicensis* Swartz Prodr. 88, 1788.

An annual stout herb. Stem obtusely quadrangular, deeply 4-grooved. Leaves 5-16 × 1.5 cm, ovate, ovate-oblong or oblong-lanceolate, apex obtuse or sometimes acute, base usually cuneate, margins coarsely crenate; petiole 1-4 cm long. Calyx in flower about 1 cm long with ten-toothed oblique mouth, the uppermost teeth longest. Corolla white. Nutlets 2-2.5 mm long, shining, black-brown, obovoid-oblong, angled in inner side, rounded on outer, at top obliquely truncate towards inner side.

Taragarh, Ajmer District, V.S. Sharma 1193.

Fl. Oct.-Nov.

Distribution :—Tropical America & Africa, India mainly Peninsula.

Incidentally it may be mentioned that *Melissa parviflora* Benth. Gen. Lab. 394, 1832-36 & in Wall. Pl. As. Rar. 1:65, 1830 non Salisb Prodr. 86, 1796 is likely to be found in Rajpur as it occurs in Mussoorie. Its correct name is *Melissa axillaris* Bakh.f. in Backer & Bakh.f. Fl. Java 2:629, 1965.

Mentha longifolia Huds. var. *incana* Raizada & Saxena in Ind. For. 92: 317, 1966; *Mentha incana* Willd. Hort. Berol. 609, 1816; *Mentha sylvestris* Linn. var. *incana* Hk.f. in Hk.f. FBI. 4: 647, 1888.

An erect or diffuse aromatic, uniformly hairy-tomentose herb. Leaves very shortly petiolate, lanceolate or oblong, 2-8 cm long, shortly toothed. Flower-whorls in terminal much interrupted spikes. Calyx bell-shaped, very shortly 5-toothed. Corolla lilac or white, tube as long as the calyx, limb nearly equal, 4-lobed.

Occurs as an escape from cultivation and almost naturalized in Dehra Dun, Raizada.

Fl. July-Oct.

Distribution:—Simla to Murree, Pakistan.

Mentha piperita Linn. Sp. Pl. 576, 1753; Hk.f. in FBI. 4: 647, 1885; Raizada in Journ. Ind. Bot. Soc. 15: 166, 1936.

A perennial aromatic herb propagating by means of stolons or runners. Stem erect or ascending 30-110 cm high, branched, glabrous. Leaves lanceolate, shortly petioled, sharply serrate, 2.5-8 cm long. Flowers in thick, terminal spikes 18-8 cm long in fruit; bracts lanceolate, acuminate. Calyx tubular-campanulate. Corolla glabrous, purple rarely white.

Run wild & naturalized along water-courses in Dehra Dun, Raizada.

Fl. Practically throughout the year.

Distribution:—A native of Europe, cultivated in all tropical countries.

Micromeria Benth. (1829) (Nom. CONS. PROP.)

Sometimes reduced to *Satureja* Linn. (1753, 1754) (vide, Briquet in Pflanzenfam. 4: 3a. 296, 1896; Brenan in Mem. New York Bot. Gard. 9: 45, 47, 1954).

The generic name *Micromeria* Benth. (Bot. Reg. 15.n. 1282, 1824) cannot be used, unless until it is conserved against earlier generic names *Xenopoma* Willd. (in Ges. Naturf. Fr. Berl. Mag. 5: 399, 1811) and *Zygis* Desv. (in Ham. Prodr. Pl. Ind. Occ. 46, 1826).

Micromeria biflora (Buch.-Ham. ex D. Don) Benth. Lab. Gen. et Sp. 378, 1834; Hk.f. in FBI. 4: 650, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14: 96, 1940; S.K. Malhotra in Mahashtra Vidhya Mandir, Patrika 5(1&2): 40, 1970. *Thymus biflorus* Buch.-Ham. ex D. Don, Prodr. 112, 1825; *Satureja biflora* (Buch.-Ham. ex D. Don) Briq. in Pflanzenfam. 4, 3a: 289, 1896; Brenan in Mem. New York Bot. Gard. 9:45, 1954.

An erect-ascending, with a woody creeping base, aromatic, tufted, perennial herb. Stems several from the base, simple or branched, short-hairy. Leaves subsessile, ovate-lanceolate, with a rounded-subcordate base, subacute, with a thickened margin, glabrous gland-punctate beneath, 0.5-0.8 × 0.2-0.4 cm. Bracts subulate, 0.1-0.15 cm long; pedicel 0.2-0.3 cm long; calyx 0.5 cm long, short-hairy, 13-ribbed, teeth subulate, ciliate, 0.2 cm long; corolla pinkish, hairy outside, 1-1.3 cm long; stamens exserted. Nutlets reddish-brown, smooth, glabrous, 0.08-0.1 × 0.03-0.35 cm.

Robber's Cave, Dehra Dun, *Raizada* s.n.; *C.R. Babu* 34928. Rocks of river-beds & ravine banks; Sahasradhara, along rocky slopes, *S.K. Malhotra* 25663.

Fl. & Fr. Oct.-March.

Distribution.—Himalaya, 300-2100 m, W. Asia, Africa.

Mosla ocymoides Buch.-Ham. ex Benth. (in Wall. Pl. As. Rar. 1:66, 1829) has been reported by Duthie (Fl. UGP. 2:257, 1911) from Dehra Dun. The current accepted name for this species in Indian botanical works is *Mosla dianthera* (Buch.-Ham. ex Roxb.) Maxim. as shown below:

Mosla dianthera (Buch.-Ham. ex Roxb.) Maxim. in Bull. Acad. Sci. St. Petersb. 20:457, 1875; Hk. f. in FBI. 4:647, 1885; *Lycopus dianthera* Buch.-Ham. ex Roxb. Fl. Ind. 1:144, 1820. *Mosla ocymoides* Buch.-Ham. ex Benth. in Wall. Pl. Asiat. Rar. 1:66, 1829; Duthie Fl. UGP. 2:257, 1911; Mukerjee in Rec. Bot. Surv. Ind. 14:101, 1940.

Since *Ocimum scabrum* Thunb. (1794) is actually conspecific with *Mosla dianthera*, the correct name for this taxon should be *Mosla scabra* (Thunb.) Raizada com. nov. (= *Ocimum scabrum* Thunb. in Trans. Linn. Soc. 2:338, 1794 non *Ocimum scabrum* Wight 1840), as its basionym *O. scabrum* Thunb. is earlier than *Lycopus dianthera* Buch.-Ham. ex Roxb. (1820) which is a basionym for *M. dianthera*.

In this connection it may be mentioned that the generic name *Molsa* was first validly published by Maximowicz (Bull. Acad. Sci. St. Petersb. 20:457, 1875 et Mel. Biol. Acad. Sci. St. Petersb. 9:430, 1875), and hence should be credited to him; not to Bentham, who first (in Wall. Pl. Asiat. Rar. 1:66, 1830) merely cited it as a synonym under the genus *Melissa* Linn. (1753, 1754), as has been done by Jackson (Index Kewensis 2:267, 1895).

The generic name *Molsa* Buch.-Ham ex Maxim. (1875) unfortunately cannot be used for this taxon, unless and until it is conserved against *Orthodon* Benth. & Oliver (Journ. Linn. Soc. 9:169, 1865) which was revived by Kudo (Mem. Fac. Sci. Agri. Taihiku 2(2): 75, 1929) as it is ante-dated by the latter generic name. In this connection it is pertinent to mention that *Orthodon* Benth. & Oliver (1865) is a later homonym of the name of a genus of mosses, *Orthodon* R. Brown, Trans. Linn. Soc. London 12:578, 1820. As such the question of conservation of *Molsa* Maximowicz (1875) vs. *Orthodon* Benth. & Oliver (1865) does not arise (cf. Taxon 19:818, 1970).

If however, the generic name *Molsa* Buch.-Ham. ex Maxim. (1875) against *Orthodon* Benth. & Oliver (1865) is not conserved

the correct name for this taxon under *Orthodon* would be *Orthodon scabra* (Thunb.) Raizada com. nov.

Nepeta bombaiensis Dalz. & Gibs. Bomb. Fl. 209, 1861; Hk. f. in FBI. 4:661, 1885; Raizada in Ind For. Rec. (n. s.) Bot. 4(3) : 70, 1951.

An erect branched herb, tomentose or laxly villous. Leaves long-petioled, rounded, ovate-cordate, coarsely crenate, about 5 cm long. Cymes all axillary, few and lax-flowered; peduncles equalling the petioles; flowers long pedicelled; calyx laxly hairy, about 6-8 mm, 3 upper teeth broadly triangular, acute, much shorter than the tube, 2 lower subulate. Nutlets nearly smooth.

Bhum, Merwar, *Duthie* 4838; Ajmer, *Lowrie* s.n.

Fl. Cold season.

Distribution:—Konkan.

This species was so far misidentified as *Nepeta hindostana* (Roth) Haines (*N. ruderalis* Ham.) from which it differs chiefly in being more hairy and in the calyx which is about 6-8 mm long, the upper calyx-teeth being broadly triangular, acute, not aristate, while in *N. hindostana* the calyx is about 4 mm long, the upper calyx-teeth being narrowly triangular, acute not aristate.

Origanum vulgare Linn. Sp. Pl. 590; 1753; Mukerjee in Rec. Bot. Surv. Ind. 14:94, 1940; Hk. f. in FBI 4:648, 1886; Collett, Fl. Sim. 391, 1902; S. K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1 & 2) : 40, 1971.

An erect herb, 30-90 cm high. Leaves petiolate, broadly ovate, 1.5-2.5 cm long, entire, rarely toothed. Flowers polygamous, crowded in numerous 4-sided spikes, 7-25 cm long, clustered or paniced terminally. Bracts imbricating, green or purplish. Calyx bell-shaped, usually 5-toothed. Corolla white or pink, tube longer than the calyx, upper lip flat, notched, lower 3-lobed, spreading.

Sahasradhara, along rocky slopes, *S.K. Malhotra* 29278.

Fl. & Fr. Sept.-Nov.

Distribution :—Temperate Himalaya from Kashmir to Sikkim, 1700-3600 m, W. & N. Asia, N. Africa, Europe.

This species is common along waysides usually in shady places, at times in forest under growth between 1700-2200 m in Mussoorie, between Barlowganj and Kinraig Kampte Road, Benog etc. I have great doubt if this species was collected at the foot of Sahasradhara but must have come from above 950 m.

Plectranthus mollis (Ait.) Spreng. Syst. 2:690, 1825; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 47, 1940. *Ocimum molle* Ait. Hort. Kew 2:322, 1789; *Plectranthus incanus* Link Enum. Hort. Berol. 2:120; 1822; Hk. f. in FBI. 4:621, 1885.

An erect herb, 30-60 cm high, fleshy, pale or hoary with a fine pubescence. Leaves long petioled, 5-10 cm long, broadly ovate-cordate at base, deeply usually crenate, finely pubescent on both sides or almost glabrous above. Bracts small, ovate. Flowers pale lilac or light blue, in lax-flowered cymes, arranged in slender racemes which are paniculately branched below; calyx in fruit about 1 cm long, widely campanulate, 2-lipped, 10-20 cm long. Nutlets subglobose, smooth, dotted with black spots.

Mirzapur, in shady sandstone rock crevices at Robbertsganj, Bhattacharya 17716, fairly common.

Fl. & Fr. Aug.-Oct.

Distribution :—Simla to Sikkim at 1750 m, Khasi Mts. Central India, common in Agencies of N. Circars, Visakapatnam, Bihar.

Plectranthus striatus Benth. in Wall. Pl. As. Rar. 2:17, 1831; Hk. f. in FBI 4:618, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 43, 1940; Raizada in Journ. Ind. Bot. Soc. 15:166, 1936; *Plectranthus gerardianus* Benth. in Wall Pl. As Rar. 2:17, 1831; Mukerjee l.c. 31; Hk. f. in FBI. 4:618, 1885, *P. gerardianus* Benth. var. *brachyantha* Hk. f. in FBI. 4:618, 1885.

A herb, 0.3-1 m high. Leaves opposite, broadly ovate, ovate-lanceolate, 3.5-10 × 2.5-4.5 cm, base cuneate, rounded or subcordate, crenate or crenate-serrate, upper most pair sessile; lower surface gland-dotted. Flowers in terminal and axillary panicles. Calyx tubular-campanulate, indistinctly 2-lipped and shortly 5-toothed in fruit. Corolla white, the middle-lobe of the upper lip larger, deeply notched and spotted purple, lower lip boat-shaped; lobe straight.

Dehra Dun Duthie s.n.; Dehra Dun, B.L. Gupta Dehra Dun Herb. No. 42596; Sahasradhara, Raizada s. n.; Som Deva, 1330.

Fl. Cold season, specially Oct.-Dec.

Distribution :—Temperate Himalaya from Kashmir to Bhutan, Khasi Mts.

Salvia coccinea Juss. ex Murr. Comm. Gotting. 1: 86, t.1, 1778. var. *pseudo-coccinea* (Juss. ex Murr.) Back. Onkruidfl. Jav. Suikerr. 561, 1934; Backer & Bakh.f. Fl. Java 2: 628, 1965; *S. pseudo-coccinea* Jack. Coll. 2: 302, 1787.

An erect perennial undershrub, 0.6-1.3 m high. Stem conspicuously beset with hirsute hairs. Leaves petiolate, ovate-cordate; lamina 2.5 mm long, crenate, pubescent above, hoary-tomentose beneath; petiole beset with hirsute hairs. Flower whorls 6-10-flowered in lax interrupted terminal racemes. Calyx tubular-campanulate, striate; corolla scarlet.

Dehra Dun, *J. S. Gamble* 27439. Garden escape. New Forest, Dehra Dun, *Raizada* Dehra Dun Herb. No. 79869; New Forest, Dehra Dun, *H.B. Naithani* 3518. Escape from cultivation and now naturalized as a weed. Rajpur, *Raizada*, *Saxena*; Dehra Dun *Raizada* in waste places and on road-sides.

Fl. & Fr. July-Dec. (Greater part of the year).

Distribution:—A native of Mexico and C. America, frequently cultivated in gardens in India and now running wild in & near Dehra Dun.

Scutellaria scandens D. Don, Prodr. 110, 1825; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 144, 1940; *Scutellaria angulosa* Benth. in Wall. Pl. As. Rar. 1:67, 1830; Hk. f. in FBI. 4:667, 1885; *Raizada* in Journ. Ind. Bot. Soc. 15:167, 1963.

A pubescent or thinly hairy shrub-like herb; branches diffuse, acutely 4-angled. Leaves short-petioled, ovate or lanceolate, crenate or serrate, 2.5-5 cm long. Racemes glandular, lower bracts leafy. Flowers 2-2.5 cm long, pale-yellow or nearly white, tip tinged with purple. Nutlets granulate.

Near Robber's Cave, Dehra Dun, *Raizada* Dehra Dun Herb. No. 56063, 56064.

Fl. March-April.

Distribution:—Temperate Western & Central Himalaya from Kashmir to Nepal.

Teucrium quadrifarium Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 108, 1825; Hk. f. in FBI. 4:701, 1884; Mukerjee in Rec. Bot. Surv. Ind. 14:218, 1940; Collett Fl. Sim. 406, 1902; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 5(1 & 2): 40, 1970.

An erect herb, 0.6-1 m high. Leaves short-petiolate, ovate or ovate-oblong, cordate, serrate. Flowers in terminal paniced racemes. Bracts conspicuous, pink-purple, imbricating, broadly ovate-acuminate, 7-9 mm wide, almost completely concealing the flowers. Calyx campanulate, often purple in colour. Corolla pink or purple, scarcely twice the calyx, tube dilated upwards, limb 1-lipped, upper lip wanting; lower long, spreading, 5-lobed.

Sahasradhara, along rocky slopes, *S.K. Malhotra* 29257.

Fl. Aug.-Oct. *Fr.* Nov.

Distribution :—Himalaya, 1200-2400 m, Khasi Mts.; Burma, China.

This species which occurs in Mussoorie, 1500-2200 m, is not likely to have been collected from the foot hills of Sahasradhara and must have come from a much higher altitude.

Teucrium royleanum Roxb. in Wall. Pl. As. Rar. 1:58, 1830; Hk. f. in FBI. 4:700, 1885; Raizada in Journ. Ind. Bot. Soc. 15:167, 1936; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 218, 1940.

A tomentose or hairy herb, 18-28 cm high. Leaves stalked, cordate, ovate, or oblong-ovate, 3-7 cm long, crenate or shortly toothed. Racemes seldom more than 5-8 cm long; bracts lanceolate, longer than pedicels. Flowers about 1.8 cm long, white. Calyx campanulate, upper and 2 lower usually incurved. Corolla twice as long as the calyx. Nutlets enclosed in the globose calyx-teeth, subrugose.

Tons valley, Dehra Dun, Raizada Dehra Dun Herb. No. 52853.

Fl. April-May.

Distribution :—Himalaya from Kashmir to Kumaon; Afghanistan.

PLANTAGINACEÆ

Plantago exigua Murr. in Comm. Gotting. 1:94, t. 5, 1778-79; Pilger in Pfreich. 102:42, 1937; *Plantago pumila* Linn. f. Suppl. 125, 1781; Hk. f. in FBI. 4:707, 1885; Raizada in Journ. Ind. Bot. Soc. 15:167, 1936.

A nearly glabrous small much branched herb; stem 10-30 cm, ascending, flexuous, glabrous, or puberulous. Leaves opposite, filiform, 2-4 cm long, margins revolute; peduncles in the upper axils. Spikes ovoid or subglobose, axillary, puberulous; bracts longer than the calyx, lower equalling the spikes. Flowers yellowish-white. Calyx 4, nearly as long as corolla tube, margins white. Corolla-lobes finely acuminate; anthers acuminate. Fruit as long as the calyx.

Dobhalwala, Dehra Dun, Sohan Lal Dehra Dun Herb. No. 25539, near houses; Dehra Dun, Raizada in waste places and road-sides; New Forest, Dehra Dun, H.B. Naithani 1511; Mirzapur on the banks of the river Ganga, Bhattacharya 1368.

Fl. March. *Fr.* May-June.

Distribution :—North-West India, Afghanistan, Egypt.

NYCTAGINACEÆ

Boerhavia erecta Linn. Sp. Pl. 3, 1753; Woodson & Schery et al in Ann. Miss. Bot. Gard. 48:52, 1961; Backer & Bakh. f. Fl. Java 1:271, 1963; Stemmerik in Fl. Males. (Ser. 1). 6:454, 1964; *B. punarnava* Saha and Krishna-Murthy in Journ. Sci. Ind. Research 21 C:249-55, 1962.

An erect or decumbent-ascending, annual herb. Stems ribbed, glabrous or shortly-hairy, often tinged with purple. Leaves in unequal pairs, ovate-oblong-lanceolate, rounded or cuneate at base, obtuse or rounded or acute, nearly glabrous, pale and punctate with red glands on the lower surface, sinuate or undulate, often with a purple-tinged margin, 2.5×1.3 cm; petiole 0.5-4 cm long. Flowers 2-3 together in lax, leafy, cymose panicles; bracts lanceolate; pedicels 0.01-0.3 cm long; perianth white or pink, 0.15-0.25 cm long; stamens 2-3. Anthocarp 0.25-0.3 (-0.35) cm long.

New Forest Dehra Dun, *Raizada* s.n.; Bindal, Dehra Dun, C.R. Babu 32227.

Saha & Krishna Murthy (loc. cit.) described *Boerhavia punarnava* as a new species from Pondicherry. It has been later reported as a new record for Kerala by Nair & Nair (Journ. Bomb. Nat. Hist. Soc. 61:216, 1964) and for Bombay by Ramarathinam (Journ. Bomb. Nat. Hist. Soc. 61:215, 1964). The author has carefully studied the description and has critically examined the type of *B. punarnava* Saha & Krishna Murthy and authentic specimens of *B. erecta* Linn., which shows beyond a shadow of doubt that the former is conspecific with the latter which is a tropical American species, now a pantropical weed.

Fl. & Fr. July-Oct.

Distribution.—Naturalized in waste places, gardens and road sides. Native of tropical America, perhaps recently introduced into India.

AMARANTHACEÆ

Achyranthes aspera Linn. var. *porphyristachya* Hk. f. in FBI. 4:730, 1885.

An erect stiff herb, 1.5 m high, not much branched; branches quadrangular, striate, pubescent. Leaves $2.5.5 \times 2.4.3$ cm, elliptic, acuminate at apex, glabrous, entire; flowers greenish-white, numerous, stiff, deflexed against the woolly-pubescent rachis in elongate terminal spikes; spikes slender and elongate. Perianth 0.6 cm long. Staminodes tufted on the back.

At the edge of Sal forests, Abdullagunj, Bahraich Distt. *Panigrahi* 6348, scarce.

Fl. & Fr. Oct.-June.

Distribution :—Sikkim Himalaya, Nilgiris, Andhra Pradesh etc., Bangladesh.

It is distinguished from the type by the leaves being larger, elliptic acuminate at the apex, glabrous and membranous. Spikes slender and elongate; perianth 0.6 cm long; staminodes tufted on the back.

Achyranthes bidentata Bl. Bijdr. 545, 1825; Hk. f. in FBI. 4:730, 1885; Backer in Fl. Males. (Ser. 1). 4:88, 1949.

An erect-ascending, slender, annual-perennial herb. Stems 4-gonous, somewhat flaccid, glabrous or appressedly or patently hairy. Leaves elliptic-oblong or ovate-lanceolate, rounded or cuneate at base, acuminate, subentire, thinly hairy, 6-15 (-20) × 2-7 cm; petiole 0.5-4 (-5) cm long. Spikes axillary and terminal, 5-40 cm long; rachis appressedly or patently hairy; bracts ovate, acuminate; bracteoles 0.3-0.4 (-0.5) cm long; tepals subequal, lanceolate, sharply acute, 0.35-0.4 (-0.7) cm long; pseudo-staminodes truncate or shortly dentate at apex, 0.08-0.1 cm long (incl. tube). Utricle 0.15-0.2 cm long.

Robber's Cave, Dehra Dun, Raizada s.n.; C.R. Babu 34074. Not common on ravine-slopes.

Fl. & Fr. Sept.-Dec.

Distribution :—Temperate and subtropical Himalaya from Kistwar to Sikkim, Bihar, South India, Ceylon, Java, Japan.

Allmania nodiflora R. Br. ex Wight var. *angustifolia* Hk. f. in FBI 4:717, 1885; Rau & Rao in Bull. Bot. Surv. India 2(1 & 2) : 43, 1960.

A glabrous, tall herb; leaves alternate, narrow up to 10 cm long. Flowers in axillary and terminal, brownish, rather conspicuous heads. Sepals 5, scarious, acuminate, striate. Stamens 5, united below into a cup; anthers 2-celled; staminodes absent. Ovary ovoid, style slender; utricle circumsciss. Seeds turgidly lenticular, opaque or shining.

Son river bank, Chopan, Mirzapur Dist. M.A. Rau 6109.

Fl. Rainy season.

Distribution :—Sikkim Terai, Karnataka; Malacca, Singapore and Ceylon.

Alternanthera ficoidea (Linn.) R. Br. ex R. & S. Syst. 5:555, 1819; Babu in Bull. Bot. Surv. India 8(2) : 200, 1966; Naithani & Raizada in Ind. For. Vol. 102, 1976 (in press); *Gomphrena ficoidea*

Linn. Sp. Pl. 225, 1753; *Alternanthera ficoidea* (Linn.) R. Br. ex Roem. & Sch. Syst. 5:555, 1819; Merrill, Enum. Philip. Pl. 2:131, 1923; Backer in Fl. Males. (Ser. 1) 4(2) : 93, 1949; *Alternanthera polygonoides* R. Br. Prodr. 416, 1810; Shrivastava & Santapau in Journ. Bom. Nat. Hist. Soc. 52(4):957, f. A-E, 1955 (incl. var. *erecta* Mart.); Santapau in Journ. Bom. Nat. Hist. Soc. 54(2) : 476, 1956; Ramaswamy in Bull. Bot. Surv. Ind. 6(1): 7, 1964. *Gomphrena polygonoides* Linn. Sp. Pl. 225, 1753 pp; *Telanthra polygonoides* Moq. in DC. Prodr. 13(2) : 363, 1849; *Alternanthera ficoidea* (Linn.) R. Br. Prodr. 1:417, 1810; Duke in Ann. Miss. Bot. Gard. 48(1) : 41, 1961; *A. ficoidea* (Linn.) R. Br. ex Griseb. var. *bettzickiana* (Nicholson) Backer in Back. & Bakh. f. Fl. Java 1:238, 1963; *A. ficoidea* (Linn.) R. Br. ex Griseb. ssp. *bettzickiana* (Regel) Backer in Fl. Males. (Ser. 1) 4(2) : 93, 1949; Veldkamp in Blumea 19(1) : 167-169, 1971; *A. bettzickiana* (Regel) Nicholson III. Dict. Gard. ed. 1:59, 1884 ('bettzichiana'); Bakh. f. & Veldkamp in Fl. Males. (Ser. 1) 6(6) : 915-917, f. 1, 1-4, 1972, Addenda. Corr. et Emend. *Telanthra bettzickiana* Regel, Gaerten flora 11:178, 1862 descr.; Ind. Sem. Hort. Petrop. 28, 1826 (non vidi).

A perennial herb, 10-50 cm high; stems erect, prostrate or decumbent, densely branching at base, tinged with purple on the nodes, appressed-pilose. Leaves 1-6 × 5.2 cm, in subequal pairs, oblong, oblong-obovate or spatulate, acute to obtuse, finely mucronate at apex, mostly brownish-red, sometimes green, clothed with fine denticulate hairs, glabrescent. Flowers in axillary and terminal heads, 0.5-1 cm long, often in dense clusters of 2-5. Tepals 5, unequal, ovate-lanceolate; pseudo-staminodes strap-shaped, lacerate; utricle falling off with the tepal.

Tapkeshwar, Dehra Dun, *Raizada* s.n.; C.R. Babu 34695, 35432; Kishan Nagar, Dehra Dun, H.B. Naithani 1971 (DD).

Fl. Practically throughout the year.

Distribution:—Native of Brazil, now naturalized in waste places and road-sides, often gregarious; often cultivated in gardens as border plant in tropical countries. This species was recorded for the first time from Bombay by Shrivastava and Santapau (Journ. Bom. Nat. Hist. Soc. 52 : 957, 1955), and by Ramaswamy (Bull. Bot. Surv. Ind. 6 : 7-18, 1964) from Mysore. C. R. Babu (Bull. Bot. Surv. Ind. 6:200, 1966) has recently reported it from Dehra Dun.

Bakhenzen f. & Veldkamp in Fl. Males (Ser. 1) 6(6):715, 1972 have pointed out that *A. ficoidea* (L.) R. Br. ex R. & S., 1819, non *A. ficoidea* P. Beauv. Fl. Oware and Benin 1818 is a later homonym and as such the specific name is illegitimate under Art. 75 of Code. They have, therefore, tentatively

adopted *Alternanthera bettzickiana* (Regel) Nicolson, as the correct and valid name for this species.

Alternanthera paronychoides St. Hill Voy. Bres. 2(2):43, 1833; Fawcett & Rendle, Fl. Jamaica 3:140, 1914; Schenz in Pfam, ed. 1. III, 1a: 115, 1893; Raizada in Ind. For. Rec. n.s.) Botany 1(5):223, 1939; Sundaraj in Journ. Bom. Nat. Hist. Soc. 53:525, pl. 1, 1956; Santapau in Journ. Bomb. Nat. Hist. Soc. 54:476, 1956; Dutta & Mitra in Ind. For. 87:304, f. 2, 1961; Bakhuizen Van den Brink f. & Veldkamp in Fl. Males (Ser. 1) 6(6):916, 1972, Add. Corrig. et emend; C.C. Townsend in Fl. W. Pakistan 71:72, 1874; *A. ficoidea* (L.) R. Br. ex Griseb. ssp. *betzickiana* (Regel.) Backer, Fl. Mal. Ser. 1, 4:594, 1949 pp.; Back. & Bakh. f. Fl. Java 1:238, 1963 pp. var. *paronychoides* Pederson in Darwiniana 14:439, 1967; Veldkamp in Blumea 19(1):167-169, f. 5-8, 1971.

A prostrate tufted herb, rooting at the nodes. Leaves opposite, petiolate, spathulate-elliptic, 7-15 mm long, acute or obtuse. Flowers scarious, shining white in dense sessile globose axillary heads which are up to 1.4 cm in diameter. Bracts and bracteoles small, scarious; white. Sepals (Perianth) 5, shining white, lanceolate, acute, slightly unequal, larger than the lanceolate bracts, hirsute or densely woolly below. Stamens 5, all fertile, the filaments partially united at base into a short cup-like tube. Stamnodes wider than long, shorter or as long as the filaments, toothed at the apex. Anthers 1-celled reniform to ellipsoid, yellow. Ovary 1-celled, 1-ovuled, broader than long; style short; stigma capitate. Utricle narrowly winged, obcordate, included in the perianth, brown.

Kanpur, along the sandy banks of the Ganges, Raizada 11872; Benares, at the junction of the Burna and the Ganges, close to the bank. A. C. Joshi Dehra Dun Herb. No. 79401; Rajpur, Saxena 1968; Nepalga, Bahraich distt. Panigrahi 2743; Moradabad, H.B. Naithani 6908 (DD); New Forest, Dehra Dun, H.B. Naithani 6926 (DD).

Fl. & Fr. All round the year.

Backer confused this species with *A. ficoidea* ssp. *betzickiana* and in habit difficult to discern from it, but distinctly different in structure of the filaments, pseudo-stamnodes, and anthers (Bakh. f. & Veldkamp in Fl. Males 6(6):917, 1972).

Distribution:—A native of tropical and subtropical America but now completely naturalized in many parts of the Upper Gangetic Plain. Also reported from 24 Parganas (West Bengal), Coimbatore; Thailand, Europe and Indo-Malesia, Java and Philippines.

Backer (Fl. Males. 1, 4(2):93, 1949) merged it under *Alternanthera ficoidea* (Linn.) R. Br. ex Roem. & Schult., but Duke (Ann. Miss. Bot. Garden 48(1):40, 1961) considers it distinct form *A. ficoidea* on the basis of the staminodes and treated it separately and I have followed Duke. Duke (l.c.) considers *A. polygonoides* (L.) R. Br. & *A. paronychoides* St. Hil. Br. as conspecific.

According to Duke (Ann. Miss. Bot. Gard. 48:40, 1961) *Alternanthera polygonoides* (Linn.) R. Br. ex Roem. & Schult. Syst. 5:1819, which is based on *Gomphrena polygonoides* Linn. (Sp. Pl. 225, 1753), and *Alternanthera paronychoides* St. Hil. are conspecific in which case the correct name of this taxon would be *Alternanthera polygonoides* (Linn.) R. Br. ex R. & S.

Alternanthera pungens Kunth in H.B.K. Nov. Gen. et Sp. 2:206, 1817; Raizada in Ind. For. 76: 495, 1950; Town sand in Fl. W. Pakistan 71:39, 1974; Santapau, Fl. Saurashtra 225, 1967; Backer & Bakh. f. Fl. Java 1:238, 1963; Melville in Kew Bull. 1958:174, 1958; *Achyranthes repens* Linn. Sp. Pl. 205, 1753. *Illecebrum achyrantha* Linn. Sp. Pl. (ed. 2) 299, 1762; *Alternanthera achyrantha* R. Br. Prodr. 417, 1810, (non *Alternanthera achyranthes* Forsk. 1775); *Alternanthera repens* (Linn.) Link, Enum. Fl. Hort. Berol. 1:154, 1821. (non J.F. Gmel. 1791); Backer in Fl. Males. (Ser. 1) 4(5): 91, 1949.

A prostrate spreading binneal herb, often rooting at the nodes. Stem zig-zag, 10-50 cm long, slightly tinged with pink, covered all over with shaggy hairs. Leaves simple, opposite, exstipulate, very unequal, 1.2-4 × 0.3-2 cm, elliptic-obovate, obtuse or rounded at apex, glabrous or thinly appressed pilose beneath. Flowers in heads in the axils of leaves, much compressed and chaffy. Bracteoles 2. Perianth-segment of 5 unequal, scarious sepals, 1-nerved; the outer 3 larger than the inner 2; the posterior one oblong, obtuse and with a sharp point at apex, the lateral 2, lanceolate, sharply pointed at apex and becoming spinny in fruit; the 2 inner ones fringed with hairs. Stamens 5, minute, united at the base into a cup and alternate with irregularly toothed process. Ovary superior, 1-celled, 1-ovuled. Fruit a utricle enclosed by the persistent perianth, the bracts and bracteoles, much compressed, truncate or retuse. Seed round, brownish.

New Forest, Dehra Dun, Raizada Dehra Dun Herb. No. 39313, H.B. Naithani 6599; Ajmer, Brahma Datt Tyagi Dehra Dun Herb. No. 100961; Moradabad, H.B. Naithani. 6912 (DD).

Fl. & Fr. practically throughout the year.

Distribution :—A native of tropical America. It was introduced in this country about 1913. This weed was first collect-

ed on the Malagiri Hills in Salem District, Madras in 1913 and is now rapidly spreading and has already established in Coimbatore, Bangalore, Madras and various parts of Andhra Pradesh. It has been collected from Bombay by Santapau, and from Keonjhar State, Orissa by Mooney. I have personally seen it growing at Shahadra, near Delhi, at Meerut and in the I.A.R.I., New Delhi. It is common along road sides, railway lines and in wastelands preferably in rocky areas and on heaps of brick and mortar.

Amaranthus hybridus Linn. subsp. *incurvatus* (Gren. & Godr.) Brenan var. *paniculatus* (L.) Mansf. Die Kulturpfl. Beih. 2 (1959) 54; Brenan in Watsonia 4:268, 1961; Backer in Fl. Males. (Ser. 1) 6(6):915, 1972. (Add. Corr. et emend.); *Amaranthus hybridus* Linn. Sp. Pl. 1:990, 1753; *A. cruentus* Linn. Syst. (ed. 10) 1269, 1759; Duke in Ann. Miss. Bot. Gard. 48:15, 1961; *A. paniculatus* Linn. Sp. Pl. (ed. 2) 406, 1763; Hk. f. in FBI. 4:718, 1888.

An erect herb, 0.15-2 m high; all parts often red. Leaves long-petiolate, ovate-oblong, lanceolate, obtuse, shortly acuminate. Flowers greenish often red, unisexual, monoecious; flower-clusters crowded, paniculate or spicate; panicle (spikes) terminal and axillary. Bracts setaceous, longer than the perianth. Tepals 5. Stamens 5. Styles 3, less often 2. Utricle circumsciss in the middle, 0.2 cm long.

Often grown in fields as a crop and frequently found along way sides, in waste places and as a weed in wheat fields.

Rajpur, Saxena, 1238; New Forest, Dehra Dun, H.B. Naithani 1549.

Fl. & Fr. April-Nov.

Distribution :—Cultivated or as escape throughout India, up to 2700 m, on the Himalayas; Ceylon. Cultivated or escape in East and West Asia and Africa.

Amaranthus lividus Linn. var. *ascendens* Thell, in Asch. & Gr. Syn. 5. 1914; Backer in Fl. Males. (Ser. 1) 4:79, 1949; Saxena in Journ. Bomb. Nat. Hist. Soc. 64(1): 89, 1971; Allen in Rech. f. Fl. Iranica Lf 91:4, 1972.

A procumbent herb; stem often pinkish. Leaves long-petioled, ovate, ovate-oblong, rhomboid-ovate, with broadish usually deeply emarginate apex. Flowers greenish, occasionally pinkish, unisexual, monoecious, in axillary clusters or forming terminal and axillary spikes; bracts and bracteoles much shorter than the perianth. Tepals 3, exceptionally 4. Stamens 3; filaments much shorter than the perianth. Styles 2 (-3). Utricle

smooth or faintly rugulose when ripe, slightly exceeding the perianth.

Frequent in waste land and often along drains at Rajpur, Saxena 758.

Fl. & Fr. March-Oct.

The identification of the specimen quoted above (Saxena 758) was confirmed by Van. Oostroom, Rijksherbarium, Leiden. The variety (var. *ascendens* Thell) is a new record for India.

Another species *Amaranthus chlorostachya* Willd. (Hist. Amaranth. 34, t. 10, f. 19, 1790; Allen in Rech. f. Fl. Iranica Lf 91:4, 1972) which is occasionally found at Barlowganj (Mussoorie) probably also occurs at Rajpur. It flowers in May-June and is apparently a new record for India. It was also identified by Van Oostroom, Rijksherbarium, Leiden.

Gomphrena celosiodes Mart. Biotr. Amar. 193, 1825 and in Nov. Act. Nat. Curr. 13:301, 1826; Moq. in DC. Prodr. 13(2): 410, 1849; Sandwith in Kew Bull. 1946:291, 1946; Backer in Fl. Males. (Ser. 1) 4(2): 96, 1947; Raizada in Ind. For. Rec. (n.s.) Botany 4(3): 71, 1950; C.C. Townsend in Fl. W. Pakistan 71: 44, 1974; *G. decumbens* sensu Gamble; Fl. Madras 12(7): 1179, 1925 et auctt. al., non Jacq.

An annual or perennial. much branched, prostrate or procumbent herb 10-25 cm long. Tap root stout, very long. Branches densely clothed with adpressed or spreading long white hairs; nodes swollen. Leaves opposite, shortly petioled or sub-sessile, 2-4 × 0.5-1.2 cm, spatulate or oblong-lanceolate, acute, ending in a rather short point, glabrous or adpressedly pilose on both surfaces. Flower heads sessile, above the highest pair of leaves, at first sub-globose, about 1 cm in diameter, gradually lengthening on spike, finally up to 4 cm long. Flowers hermaphrodite, dull white, compressed, each with one bract and two bracteoles. Bracts short, membranous, ovate acute, at times denticulate, persistent; bracteoles as long as the flower, boat-shaped, white, membranous and shortly winged on the back at the top. Perianth 5-partite, covered with dense white wool, the 2 inner lateral segments larger, concave, woolly, perfectly green along the middle, the 3 outer ones transparent, scale-like woolly at the base only; staminal-tube long, 5-fid; anthers yellow, 1-celled, filaments united into a long tube. Styles short, 2-lobed. Fruit enclosed by hardened perianth. Seeds small, somewhat compressed, shining, reddish-brown or orange-red, falling away from the fruit on ripening.

Near Birpur, on the bank of river, Dehra Dun, Raizada Dehra Dun Herb. No. 80081; New Forest, Dehra Dun, H.B.

Naithani 3537; Allahabad, *G.D. Srivastava*, Dehra Dun Herb. No. 94895; Ajmer, *Brahma Datt Tyagi* Dehra Dun Herb. No. 100962.

Fl. & Fr. throughout the year.

Distribution.—Native of South Brazil, Paraguay and Argentina; introduced in South Africa, India, Malaysia, Australia.

This species has erroneously been identified as *Gomphrena decumbens* Jacq. or *G. dispersa* Standley. It can, however, be distinguished from both species, by the very narrow, often obtuse and entire or scarcely toothed crest on the keel of the bracteoles, which is broadest and appears to rise at some distance below the sharply acute apex. Moreover, *G. decumbens* has the conspicuous crest of the bracteoles widest at or near the apex so that the flowers have an oblong facies. Both of these species have a more northern distribution in tropical America, namely in Mexico and Central America, and around the Caribbean Sea. There can of course be no possibility of confusion of *G. celosioides* with the commonly cultivated garden plant, *G. globosa* L., which has wider, globose, variously coloured heads.

In addition to the localities mentioned above the species has been collected from various parts of India viz., Madras, Coimbatore, South of Bastar State (Mooney), Ranikhet (Champion) and is now a troublesome weed in Dehra Dun. I have also seen it in Delhi & Meerut.

CHENOPODIACEÆ

Chenopodium ambrosioides Linn. Sp. Pl. 219, 1753; Hk. f. in FBI. 5:4. 1886; Raizada in Ind. For. Rec. (n.s.) Botany 1 (5): 224, 1950; Backer in Fl. Males. (Ser. 1) 4:101, 1949.

An erect or ascending annual, strongly aromatic, 0.15 cm to 1 m high. Stem angular-ribbed. Leaves oblong-lanceolate, coarsely or shallowly serrate-dentate or deeply incised, or higher ones entire, gradually changing into bracts. Flower clusters small, in the axils of successive conspicuous narrow bract-like leaves, united in short or longish spikes, forming together a leafy panicle; flowers mostly bisexual. Perianth 5-lobed, segments closing over the fruit. Utricle membranous. Seeds shining, brownish-black.

Near Lachiwala, Dehra Dun, *B.L. Gupta* Dehra Dun Herb. No. 20245; Rispana, Dehra Dun, *E.R. Johnson* Dehra Dun Herb. No. 22653. *Raizada* s.n.; New Forest, Dehra Dun, *Raizada* Dehra Dun Herb. No. 53539, *H.B. Naithani* 3623. A common weed in cultivated ground and waste places in and near Dehra Dun, *Raizada*; Rajpur *Saxena*, 2342.

Fl. & Fr. June-Dec.

Distribution :—Throughout India, Nepal, Burma, Europe, Asia, Africa, Australia; native of tropical America.

PHYTOLACCACEÆ

Rivinia humilis Linn. Sp. Pl. 121, 1753; Walter in Pfreich. 39:102, 1909 (incl. var. *glabra* (Linn.) Walt.); Backer in Fl. Males. (Ser 1) 4:229, 1949 Raeder in Ann. Miss. Bot. Gard. 48: 76, 1961; Backer & Bakh. f. Fl. Java 1:227, 1963; *R. laevis* Linn. Mant. 1:41, 1767; *R. orientalis* Moq. in DC. Prodr. 13:12, 1849.

An erect, usually branched, perennial herb, with a woody base. Stems scandent or rambling, glabrous down-wards, patent-hairy towards the apex. Leaves ovate-lanceolate-oblong or elliptic, with a rounded, subcordate or truncate base, acuminate, subentire, repand, glabrous except hairy nerves beneath, 2.5-10 (-12) × 1.5-6 cm; petiole 0.5-8 cm long. Flowers in erect, shortly patent hairy or glabrous, 3-12 cm long racemes; bracts lanceolate, 0.05-0.2 cm long; pedicels erect or erect-patent, 0.2-0.3 cm long during anthesis, afterwards 0.5-0.7 cm long; tepals 4, white or diffused with pink, oblong, obtuse, 0.25-0.3 cm long during anthesis, 0.3-0.35 cm long in fruiting; stamens 4; fruit red, 0.3-0.4 cm across; seeds patently short-pubescent.

New Forest, Dehra Dun Raizada, H.B. Naithani 7176; Faizabad, Y.K. Sarin 8480; Saharanpur Raizada; Rajpur Road, Dehra Dun, C.R. Babu 3229; Pilibhit, C.L. Malhotra 42336, O.P. Misra 57951; Residency grounds, Lucknow, H.B. Naithani Ser. II No. 99.

Fl. & Fr. July-Nov.

Distribution :—It is a native of tropical America.

This species is variable in the degree of hairiness and size and shape of leaves.

POLYGONACEÆ

Polygonum amplexicaule D. Don, Prod. Fl. Nep. 70, 1825; Hk. f. FBI. 5:32, 1886; S.K. Malhotra in Maharashtra Vidhyan Mandir, Patrika 6(1) : 42, 1971.

An erect herb, 0.4-1 m high. Lower leaves long petiolate, upper stem-clasping, ovate, upto 24 cm long, cordate, minutely serrate, long pointed; stipules tubular, 3-9 cm long. Flowers pink, deep red or white, crowded in one or two erect racemes. Bracts flat.

Sahasradhara S.K. Malhotra 34849. A herb growing on moist rocks.

Fl. & Fr. July-Sept.

Distribution :—N.W. Himalaya, up to 3000 m, from Murree to Sikkim.

Polygonum chinense Linn. var. *ovalifolia* Meissn. in Wall. Pl. As. Rar. 3:60, 1883; Hk. f. in FBI. 5:45, 1886; Merr. Enum. 2:122, 1934; Raizada in Proc. Nat. Inst. Sci. India 24 (4) : 201, 1958.

A diffuse, much branched scrambling or erect undershrub. Leaves 10-15 × 4-7 cm, ovate or ovate-oblong, acute at both ends, often subcordate at the base, glabrous, more or less crenulate; peduncles glandular hispid. Flowers white in capitate heads forming axillary and terminal divaricate, pubescent panicles. Bracts scarious.

Frequently grown in Dehra Dun etc. Also running wild, and found in waste places etc. in Dehra Dun Raizada; New Forest, Dehra Dun, H.B. Naithani 3589.

Fl. & Fr. Jan.-May.

Distribution :—Himalayas, Parasnath, Deccan Mts., Ceylon etc.

Polygonum longisetum De Bruyn in Miq, Pl. Jungh. 307, 1854; Danser in Bull. Jard. Bot. Buit. Ser. 3. 8:170, 1927; Back. & Bakh. f. Fl. Java 1:225, 1963. *P. caespitosum* Bl. var. *longisetum* (De Bruyn) Steward in Contr. Gray Herb. 5(88) : 67, 1930.

An erect-ascending annual herb, with a decumbent-creeping base. Stems glabrous, often purple-tinged, ochreae thinly adpressed-hispid, with 0.8-1.5 cm long cilia. Leaves short-petioled, elliptic-lanceolate-oblong, with an acute base, acute or acuminate, adpressed-hairy along the margin and on the nerves beneath, pellucid-dotted, 3-15 × 0.7-2 cm. Pseudo-spikes slender, filiform, interrupted at the base, 1-5 cm long; bracts glabrous, 0.3 cm long with 0.2-0.3 cm long cilia, which at first erect, afterwards widely paten; pedicels 0.2-0.3 cm long; perianth pink, 0.2 cm long; segments oblong-rounded, 0.2 cm long; stamens 8. Nut 3-quetrous, dark-brown, granulate, 0.2-0.22 cm long.

Bindal, Dehra Dun, C. R. Babu 35446, 34741; Kuoanwala, Dehra Dun, H.B. Naithani, Ser. II No. 5(B). Common in fields and gardens. especially along water sides.

Fl. & Fr. Sept.-Nov.

Distribution :—Malaysia.

Steward (loc. cit.) reduced this species to a variety of *P. caespitosum* Bl. The flowers are frequently infected with smut-fungi. Steward (loc. cit.) recorded it only from N.W. Himalaya in India—not from the Upper Gangetic Plain.

Polygonum minus Huds. Fl. Angl. (ed. 1) : 148, 1762; Hk. f. in FBI. 5:36, 1886; Back. & Bakh. f. Fl. Java 1:224, 1963; Siddiqui & Dixit in Bull. Bot. Surv. Ind. 11 (3 & 4) : 432, 1969.

A decumbent herb, with slender leafy stems often rooting at base. Leaves 2.8×0.7 -1.5 cm, lanceolate to linear, short-petiolate. Ochreae 5-10 mm long, tubular, pubescent and ciliate. Flowers small, white in terminal or axillary cylindrical 1-3 cm long spikes. Bracts ciliolate. Achenes 1-2 mm long, equal to the perianth at maturity, brown or black, shining, biconvex.

Gorakhpur, Siddiqui 22; fairly common in marshy or waterlogged places along nullahs, ponds and ditches, often in association with *Polygonum hydropiper* Linn. New Forest, Dehra Dun, H.B. Naithani Ser. II. No. 61.

Fl. & Fr. Jan.-April.

Distribution:—Kumaon, Kashmir, Nepal, Bengal, Madras, Ceylon Malesia.

Polygonum mite Schrank. Baier. Fl. 1:688, 1793; Gage in Rec. Bot. Surv. Ind. 2:400, 1903; Saxena in Journ. Bom. Nat. Hist. Soc. 64 (1) : 59, 1967.

A suberect annual herb; branches glabrous. Leaves very shortly petioled, lanceolate, 2.5-5.5 cm long, acute; stipules tubular, ciliate on the margin. Racemes loose, interrupted; bracts tubular, margin ciliate. Perianth glabrous. Nutlet small, black, trigonous.

Occasional along streams at Rajpur, Saxena 1606.

Fl. & Fr. June-Dec.

Distribution :—N.W. Himalaya.

This species is closely allied to *P. hydropiper* which, however, differs in having glandular perianth. *P. posumbu* is also allied to the present species and hardly differs from it.

Polygonum persicaria Linn. Sp. Pl. 361, 1953; Hk. f. FBI. 5:35, 1886; Back. & Bakh. f. Fl. Java 1:224, 1963; Siddiqui & Dixit in Bull. Bot. Surv. Ind. 11 (3 & 4) : 432, 1969.

A glabrous or puberulous suffruticose herb with erect or ascending branches. Leaves $4-10 \times 0.6-1.7$ cm, lanceolate, sessile, usually with a dark-brown spot in the centre. Ochreae cylindrical, short or long-ciliate. Flowers pink or reddish, 2-4 mm long, slightly exserted, in cylindrical terminal spikes. Bracts ciliolate. Achenes $1.5-3 \times 1.5-3$ mm, triangular, rarely lenticulate, smooth, shining.

Tura nala in Ramgarh forest, Gorakhpur, Siddiqui 617, rare.

Fl. & Fr. Oct.-Dec.

Distribution:—Malasia.

Polygonum pulcherum Bl. Bijdr. 530, 1826; Graham in Fl. Trop. East Africa (Polygonaceae): 20, 1958; Back. & Bakh. f. Fl. Java 1:223-224, 1961; Siddiqui & Dixit in Bull. Bot. Surv. Ind. 11 (3 & 4): 432-433, 1969, *P. tomentosum* Willd. Sp. Pl. 2:447, 1799; Hk. f. in FBI. 5:30, 1886.

An erect, pubescent or glabrous undershrub, 0.3-1.5 m tall. Leaves 7-15 × 1.3-3 cm, lanceolate or ovate-lanceolate, acuminate, short-petiolate, silky-tomentose beneath, pubescent above, ochreae tubular, truncate, striate, pubescent, densely silky at the top. Flowers white, in terminal panicle racemes. Pedicels pointed. Bracts obovate or orbicular, strigose, ciliate. Perianth 2.5-3 mm long. Achenes 2-3.5 × 2-3.5 mm, black, shining, biconvex.

Gorakhpur, Siddiqui 983, frequent, being found along the embankments of rivers and nallahs in association with *Arundo-donax* Linn.

Fl. & Fr. Nov.-May.

Distribution:—Bengal, Assam, Bombay, Karnataka, Tamil Nadu, & Ceylon.

Polygonum recumbens Royle ex Bab. in Trans. Linn. Soc. 18:116, 1838; Hk. f. in FBI. 5:25, 1886; Steward in Contr. Gray Herb. 5(88): 18, 1930; Som Deva in Bull. Bot. Surv. India 10(2): 180, 1968.

An erect-ascending, perennial herb, with a woody base. Stems stout-ribbed, short hairy, ochreae membranous, irregularly lacerate, with excurrent nerves, 0.4-0.8 cm long. Leaves rather crowded, short-petioled, obovate-elliptic, narrowed to the base, subacute, apiculate, scabridulous along the margin and on the midrib-beneath. Perianth 0.2 cm long, pink.

Sahasradhara, Raizada; Som Deva 438; near Rajpur, Som Deva 2203; Rispana, Dehra Dun, C. R. Babu 34948; 13 Balbir Road, Dehra Dun, H. B. Naithani Dehra Dun Herb. No. 150622.

Fl. & Fr. March.

So far known only from the higher elevations of N. W. Himalayas. It is found in sandy river beds.

P. orientale Linn. and *P. lapathifolium* Linn. var. *lanatum* (Roxb.) Steward (= *P. lanigerum* auct. Asiat. Fl. (non R. Br. 1810) have been recorded from Dehra Dun by Duthie in his

Flora, but I have neither collected nor seen any specimens from this area.

Polygonum strigosum R. Br. Prodr. 420, 1810; Hk.f. in FBI. 5: 47, 1886; Back. & Bakh. f. Fl. Java 1:222, 1963; Som Deva in Bull. Bot. Surv. Ind. 10(2): 180, 1968.

Stem 36-108 cm, rather stout, variable in amount of prickles, suberect, angles, petioles and nerves of leaf beneath more or less covered with recurved prickles. Leaves 2.5-12 cm, rigid, shortly petioled, linear or linear-oblong, acuminate, glabrous or pebescent beneath, scabrid above, margin with rigid minute recurved prickles, mid rib usually prickly; petiole up to 1.5 cm or 0. Stipules 2.5 cm, ciliate, glabrous or hairy, base with usually a pectinate ring of reversed prickles. Peduncles slender, prickly; racemes about 1 cm, densely many-or few-flowered; bracts strigose; flowers pink. Perianth-lobes obtuse. Stamens 6-8; styles slender, connate below. Nut black, opaque, punctulate.

Clement Town, Dehra Dun, *Raidaza* s.n.; *Som Deva* 1280; Mothronwala, Dehra Dun, *Som Deva* 2885.

Fl. & Fr. March-April.

Distribution:—Tropical Himalaya from Kulu to Bhutan, and the Khasi hills ascending to 1500 m; in watery places, Nilgiris, Bangladesh, Burma, Ceylon, Java, Malaya, China.

ARISTOLOCHIACEÆ

Aristolochia littoralis Paroch. in Anal. Soc. Cient. Argent. 5: 155, 1878; Loigier in Rhodora 67: 328, 1965; Pfeifer in Ann. Miss. Bot. Gard. 53: 110, 1966; *Aristolochia elegans* Mast. in Gard. Chron. 2: 301, 1885; Merr. Enum. 2, 119, 1933; Bor & Raizada in Beautiful Indian Climbers & Shrubs 26, f. 22, 1954.

A glabrous, climbing shrub. Leaves broadly reniform-cordate, obtuse or rounded, long-petiolate; basal lobes rounded. Flowers solitary, axillary, blotched with dark purple or violet-brown, white outside. Perianth-tube elongated, yellowish-green; limb nearly circular. Fruit long beaked, 5-6 cm long, excluding the beak.

Grown as an ornamental climber along the trellises, forming a dense screen with its foliage, throughout the plains; also in Delhi etc.

Fl. Rainy season. **Fr.** Cold season.

Distribution:—Native of tropical America (Argentina), now cultivated in all warm countries.

Aristolochia indica Linn. Sp. Pl. 960, 1753; Hk. f. FBI.

5: 75, 1886; Raizada in Ind. For. Rec (n.s.) *Botany* 4(3): 71, 1951; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 574, 1966.

A perennial shrubby twiner; stem long, woody at base, glabrous. Leaves $3.5-10 \times 1.2-3$ cm, very variable, obtusely acuminate at apex, cuneate, rounded or subtruncate or subcordate at base, entire with somewhat undulate margins, glabrous. Flowers few, in axillary racemes; perianth-tube white; tip purplish or brownish. Capsule 3.5-5 cm long, oblong or globose-oblong, 6-valved.

Saugor, D. O. Witt; Ranipur, Banda Sri Ram Dehra Dun Herb. No. 52479; South Lalitpur, Sri Ram Dehra Dun Herb. No. 52480. Also reported from Jhansi and Gorakhpur.

Fl. Aug.-Nov. Fr. Oct.-March.

Distribution:—Throughout the low country from Nepal and lower Bengal to Bangladesh and the Deccan Peninsula; Ceylon.

PIPERACEÆ

Piper longum Linn. Sp. Pl. 29, 1753; Hk.f. in FBI. 5: 83, 1886; Raizada in Ind. For. Rec. (n.s.) *Botany* 1: 224, 1939; P.C. Kanjilal For. Fl. Plains Uttar Pradesh 576, 1966.

A rambling undershrub, creeping and rooting below. Leaves alternate, ovate, 5-12.5 cm long, shortly acuminate, base cordate. Flowers dioecious, greenish or yellowish, in cylindric spikes, 1.2-6.2 cm long. Perianth 0. Berries crowded, 1-seeded.

Lachiwala, Dehra Dun U. N. Kanjilal, Raizada; Rajpur, Saxena 1033; Nisangahera Range, Bahraich, Sri Ram Dehra Dun Herb. No. 52536; Gorakhpur, P. C. Kanjilal.

Fl. Aug.-Sept. Fr. Cold esason.

Distribution:—Hotter part of India; Dehra Dun, Bahraich, Gorakhpur; Nepal, Ceylon, Malaya Islands.

Piper nepalense Miq. Syst. Pip. 318, 1834; Hk.f. in FBI. 5: 89, 1886; Raizada in Ind. For. Rec. (n.s.) *Bot.* 1(5): 224, 1939.

A slender climber. Leaves alternate, petiolate, ovate or ovate-lanceolate, 7-12.5 cm long, caudate-acuminate, base acute or rounded. Flowers dioecious in more or less interrupted spikes, 5-10 cm long. Perianth 0. Male spikes slender; female spikes long, straight or flexuous; bracts orbicular, sessile. Fruiting spikes 5-15 cm long. Berries ovoid, pointed, granulate.

Dehra Dun, Parkar, Raizada.

Fl. June.

Distribution:—Himalaya, 600-1500 m, Bhutan, Khasi Mts.

PROTEACEÆ

Grevillea robusta A. Cunn. ex R. Br. Prot. Nov. 24, 1830; Parker For. Fl. Punjab 430, 1918; Maheshwari Fl. Delhi 308, 1963.

A lofty, robust tree with hoary or rusty-tomentose, young branches. Leaves fern-like, bipinnate or sometimes tripinnate; pinnae entire or deeply pinnatifid, lanceolate, dark-green, above grey silky, later white-silky beneath. Flowers greenish-yellow mixed with orange, in secund, one-sided, showy racemes. Ovary stipitate; style long, lateral. Fruit an oblique, coriaceous, 1.6 × 1 cm follicle, brown. Seeds 1 or 2, winged all round.

Commonly planted in lawns, gardens and along roadsides. It grows well in the climate of Delhi, Dehra Dun, Saharanpur etc.

Fl. March-April. *Fr.* May-July.

Distribution:—Native of Queensland and New South Wales. Cultivated in other tropical countries.

LORANTHACEÆ

Taxillus vestitus (Wall.) Danser in Bull. Jard. Bot. Buitenz. (Ser. 3) 10: 355, 1929 & 29: 126, 1933; *Loranthus vestitus* Wall. in Roxb. Fl. Ind. (ed. 1) 2: 218, 1824; Hk.f. in FBI. 5: 212, 1886; Som Deva in Bull. Bot. Surv. Ind. 10(2): 181, 1968.

A woody parasite; leaves opposite, petiolate, oblong-ovate, or elliptic, glabrous, deep green and shining above, densely ferruginous-tomentose beneath, base rounded or cuneate. Flowers rusty-tomentose, 4-merous, in few-flowered umbels; buds with globose apex. Fruit ovoid, tomentose.

Sahasradhara, *Raizada* s.n.; *Som Deva* 2192; along nala on several trees.

Fl. Sept.-Nov.

Distribution:—W. Himalaya, 1500-2100 m, from Garhwal to Nepal; Khasi hills.

EUPHORBIACEÆ

Acalypha australis Linn. Sp. Pl. 1004, 1753; Singh in Ind. For. 93(3): 186, 1967; *Acalypha chinensis* Roxb. Fl. Ind. 3: 677, 1832.

A slender herb up to one metre high; stem slender, trailing or straggling, copiously branched, green rarely purplish, hispidly hairy. Leaves simple, alternate, petiolate, petiole slender, ovate-lanceolate, crenate, acute, glabrate above, glabrous beneath, 3-nerved, 7×3 cm, stipulate; stipules slender, about 1 mm long, hairy. Flowers in erect, axillary elongate, lax spikes, monoecious; spikes about 7 cm long; peduncles slender about 6 cm long. Male flowers minute, clustered towards the apex, ebracteate, reddish, minutely pedicelled. Perianth segments 4, free, membranous, 4-partite, ovate, concave, glabrous. Stamens 8; filaments free, very small, white, connective prolonged into a hood-like structure above the anther. Female flowers in spikes of 1-4 bracts with a stalked solitary bract or sometimes at the base of large accrescent leafy bract, low on the male spikes. Female flowers subsessile, perianth parts 3, imbricate, minute, connate below, ovate, obtusely acute, serrate, ciliate at margin; bracts persistent. Carpels 3, syncarpus, green; ovary superior 3-gonous, 3-rarely 4-celled, ovoid, lower half glabrous, upper half muricately hairy. Styles 3, about 1 mm long, reddish, split into 2 subulate, filiform arms. Stigmas linear, simple, free to the base; ovules solitary in each cell. Capsule with muricately bulbous based, ovoid; regma of 3-4 cocci, crustaceous, 2-valved. Cocci ovoid. Seeds reddish.

New Forest, Dehra Dun, *Raizada*; H.B. Naithani 6571; Harbanswala Tea Estate, Dehra Dun, N. P. Singh 31666, 33549.

Fl. & Fr. Oct.-Dec.

Distribution :—A native of China extending to Japan. It was introduced to the Sibpur Botanic Garden, Calcutta and is now naturalized in India.

This species differs from *A. brachystachya* Hornem., in having foliaceous, ovate-cordate, cucullate, 3-5-flowered bracts.

Acalypha brachystachya Hornem. Hort. Hafn. 309, 1807; HK.f. in FBI. 5: 416, 1887; Pax in Pfreich. 85: 191, 1924; Backer & Bakh.f. Fl. Java 1:489, 1965.

A flaccid nearly glabrous annual 15-30 cm high. Leaves long-petioled, membranous, ovate or ovate-cordate, subacute, crenate-serrate, 2.5-7.5 cm; petiole often longer than the blade. Spikes all axillary, sessile, very short, andragynous. Bracts forming axillary clusters, each 0.5-1.2 cm long, lateral segments shorter, all spreading. Male flowers very few, terminal minute; female bracts few, 2-3-flowered, crowded at the base of the spikes, very large, cut into 3 linear spreading, 1-nerved, obtuse lobes; styles pectinately lacinate. Capsules hispid, quite con-

cealed in the large green bracts. Seeds subglobose, nearly smooth.

Along way sides or waste places in open or shady situation at Rajpur *Sexena* 1060; Robber's Cave, Dehra Dun *Raizada*; New Forest, Dehra Dun, *H. B. Naithani* 7459, 7460 (DD).

Fl. Sept.-Nov.

Distribution:—Temperate Himalaya from Kashmir to Nepal, Khasi Mts. Deccan Peninsula from Kanara southward; Ceylon, Java, Tropical Africa, China.

Acalypha lanceolata Willd. Sp. Pl. 4:524, 1805; *A. fallax* Muell.-Arg. in Linnæa 41:1865; Hk. f. in FBI. 5:416, 1887; *Raizada* & *Sharma* in Ind. For. 88(5) : 366, 1962.

An annual puberulous herb 15-45 cm high. Leaves 2.5 × 1-2.5 cm long; petiole slender, 1-3 cm long. Flowers borne in short sessile axillary or in terminal spikes; the male flowers very minute in small fascicles, almost concealed by the upper most bracts or produced in a short spike, pistillate somewhat distantly borne below the males, each in the axil of a conspicuous 8-12 toothed, persistent bract. Fruit 0.2-0.3 cm across, much exserted from the bracts; cocci hispid. Seeds 0.15 cm long, ovoid, glabrous, brown.

Ajmer District : Puchkund, *V.S. Sharma* 420; Happy Valley, *Sharma* 660; Pushkar Ghat, *Sharma* 1117, Jawaja-Bhim Road, *Sharma* 1270; Antair, *Sharma* 1748.

This species is abundant throughout the hilly forests after rains.

Fl. & Fr. Sept.-Nov.

Distribution:—Deccan Peninsula from Mysore and the Circars southwards; Burma, Ceylon, Sumatra, Java etc.

Acalypha wilkesiana Muell.-Arg. in DC. Prodr. 15:817, 1866; Merr. Enum. 2:449, 1933; Maheshwari Fl. Delhi 317, 1963; Backer & Bakh. f. Fl. Java 1:489, 1963; *A. tricolor* Seem. Fl. Vit. 225, 1867.

A shrub. Leaves usually broad cordate, short acuminate, crenate, variously mottled with shades of red and purple. Spikes slender, 20 cm or more in length, in facinating, drooping festoons; flowers small, bright red.

A common garden favourite, planted for hedges and fences around gardens and parks. Two varieties, *marginata* T. Moore (*A. marginata* Hort.), and *macrophylla* N. Taylor, are also grown in similar places.

hispidly hairy branches, often one side purple. Leaves opposite 5-10 × 3 mm, obliquely oblong, minutely serrate towards the tip, 3-nerved, the nerves prominent. Inflorescence of short axillary leafy racemes-like branches with 1 axillary involucre to each pair of leaves or sometimes reduced to a cluster of 2-3 involucres on a short peduncle. Involucre glabrous or slightly pubescent with 4-glands and lobes. Cocci prominently keeled with stiff-spreading hairs on the keels. Seeds 4-angled, brown, transversely furrowed.

Bahraich, *Raizada*; Mirzapur, Pilibhit, Agra, Bulandshahr, Moradabad, *Raizada*; New Forest, Dehra Dun. H.B. Naithani 6592; Dehra Dun, *Gamble*, *Raizada*; Baki, Gonda district, *Harsukh* 22503; Delhi, *Maheshwari*; Katnyaghat, Bahraich distt. *Harsukh* 22503; Allahabad, Baxeband Road, *Panigrahi* & *Raja Gopal* 4291 A., 16th Aug. 1965; Zoological Park, New Delhi, H.B. Naithani 3209.

Distribution.—Native of West Indies, tropical America and W. Africa. Introduced in many countries and naturalized in tropics of Africa & Asia.

It much resembles *E. clarkeana* Hk.f. which, however, possess glabrous capsules. It closely resembles *E. orbiculata* H.B.K. Nov. Gen. & Sp. 2: 52. 1817(=*Euphorbia microphylla* Heyne ex Roth non Lamk. 1786=*E. bombaiensis* Santapau in Bull. Bot. Soc. Beng. 8: 17, 1954) differing in the ciliate keel of cocci.

Incidentally the correct name of *Euphorbia microphylla* Heyne ex Roth. Nov. Pl. Sp. 229, 1821 (non Lamk. 1788): Hk.f. in F.B.I. 5: 252, 1887; Duthie Fl. U.G.P. 3(1): 82, 1915 is *Euphorbia orbiculata* H.B.K. Nov. Gen. et Sp. 2: 52, 1817, vide Rajgopal & Panigrahi in Taxon 17(5): 547, 1968 & Backer & Bakh.f. Fl. Java 1: 503, 1963 & 3: 649, 1968; *E. bombaiensis* Santapau in Bull. Bot. Soc. Beng. 8: 17, 1955 is also synonymous with this species. In point of fact Backer & Bakh.f. in Fl. Java 1: 503, 1963 treated *E. microphylla* Heyne ex Roth. as a synonym. The correct name according to Mitra Journ. Bomb. Nat. Hist. Soc. 68(3): 852-856, 1972 of *E. orbiculata* H.B.K. is really *E. serpens* H.B.K.

Euphorbia helioscopia Linn. Sp. Pl. 459, 1753; Hk. f. in FBI. 5: 262, 1887; *Raizada* in Ind. For. Rec. (n.s.) Botany 1(5): 225, 1939; *Galarhoeus helioscopius* (L.) Haw. Syn. Pl., Succ. 152, 1812; Hurusawa in Journ. Fac. Sci. Univ. Tokyo, Sect. 3, 6: 237, 1954.

A glabrous stout erect much-branched herb, dichotomously branched above. Stem-leaves alternate, shortly stalked, obovate

or spatulate, 2.5-5 cm long, lower ones smaller, tip finely toothed. Inflorescence umbellate, rays often very short. Involucres 4-toothed; glands yellow, rounded, entire. Styles free. Capsule smooth, globose; seeds reticulately pitted.

Sahasradhara, Dehra Dun, *Raizada* Dehra Dun Herb. No. 56107; Biharihar, Saharanpur District, *Raizada* Dehra Dun Herb. No. 69204.

Fl. April. *Fr.* May-June.

Distribution.—The Punjab, and Western Himalayas, in fields; introduced into the Nilgiris. Afghanistan, and westwards to Atlantic, Japan; elsewhere introduced.

Euphorbia perbracteata Gage in Kew Bull. 1914, 238; *Raizada* in Ind. For. Rec. (n.s.) *Botany* 1(5): 225. 1939.

An erect rather coarse annual, about 40 cm high with pale stems, 2-3-chotomously branched above; lower leaves alternate, sessile, narrow, oblong or linear, membranous, exstipulate, 3.5-5 cm long, deciduous, upper opposite, broader, those on the panicles ovate to orbicular, united at their bases. Involucres solitary in the upper forks and cymosely subplicate (in scorpioid biparous cymes), one in each pair of bracts alternately each side of rachis (sympodium), very shortly pedicelled, tubular-campanulate, about 0.4 cm in flower; lobes membranous, small, 2-toothed; glands 4, truncate, broadly oblong, with a reflexed horn each side, petaloid limb 0. Ovary glabrous; style connate at base, 2-lobed; stigma slightly expanded; cocci smooth about 5 mm. Seeds dark grey or brown marbled, about 2 mm; caruncle deciduous.

Banda, *Mrs. Bell* 154. (fide Gage loc. cit.).

Fl. & *Fr.* Feb.-April.

Distribution.—Central Provinces & Bihar.

This species is much confused with *E. dracunculoides* Lamk. and *E. rothiana* Spreng.; but the inflorescences are umbellate or dichasial throughout in *E. dracunculoides* while the final ramifications of inflorescence form a sympodium on which the solitary involucre is axillary, in *E. perbracteata*.

Euphorbia serpens H.B.K. Nov. Gen. 2:52, 1817; Boiss in DC. Prodr. 5(2): 29, 1862; Wheeler in Rhodora 43: 198, 1941; Hutch. & Dalziel, Fl. W. Trop. Afr. 1:421, 1958 (ed. 2-revised by R.W.J. Keay); Mitra in Journ. Bom. Nat. Hist. Soc. 68(3): 852-856, fig. 1-9, 1972; *Anisophyllum serpens* (H. B. K.) Klotzsch & Grake. Abh. Akad. Berlin, Phys. 1859: 23, 1860; *Chamaescyce serpens* (H.B.K.) Small Fl. Southeast U.S. 709, 1903; *Euphorbia makinoi* Hayata in J. Coll. Sci., Tokyo 30:262,

1911; Merr. in Philip. Journ. Sci. 16:578, 1920; *Chamaescyce makino* (Hayata) Hara in J. Jap. Bot. 14: 356, 1938; Hurusawa in J. Fac. Sci. Univ Tokyo 3, 6:291, 1954; *Euphorbia orbiculata* var. *jawaharii* Rajagopal & Panigrahi in Taxon 17:547, 1968; *E. microphylla* auct. non Heyne; Hk.f., Fl. Br. Ind. 5:252, 1887 pp.; Prain Beng. Pl. 2:692, 1963 (rep. ed.) pp.

Recently R. L. Mitra (Journ. Bom. Nat. Hist. Soc. 68(3) 852-856, 1972) has pointed out that the plant which hitherto goes under the name of *E. microphylla* Heyne or *E. bombaiensis* Santapau or *E. orbiculata* H.B.K. is really *E. serpens* H.B.K.

E. serpens H.B.K. can be differentiated from *E. orbiculata* H.B.K. (= *E. bombaiensis* Santapau, *E. microphylla* Heyne) as follows:—

Plant rooted at nodes (at least root primordia present); leaf apex retuse, mucronulate. Stipules on both sides united, broad, scale-like, membranous, margin shallowly incised or toothed irregularly.....*E. serpens*

Plant not rooted at nodes; leaf apex notched, mucronulate, obscurely denticulate. Stipules on upper side distinct, deeply lacinate; lower united, bilobed, each lobe deeply lacinate*E. orbiculata*

Glochidion assamicum Hk.f. in FBI. 5: 319, 1887; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 226, 1939; Osmaston For. Fl. Kumaon 478, 1927; P. C. Kanjilal For. Fl. Plains Uttar Pradesh 618, 1966.

A small evergreen glabrous tree. Leaves 9.5-15 cm long, 3-6 cm broad, elliptic, or elliptic-oblong. Flowers pale green, in axillary fascicles; males long pedicelled, females nearly sessile, often numerous. Capsule indistinctly lobed, nearly sessile, about 8 mm across. Seeds with orange aril.

Dehra Dun, Mackinon; Raizada; Ramganga Valley, Kalagarh Div., A. E. Osmaston 1924. Also recorded from Pilibhit, Kheri, Bahraich, Gonda, Gorakhpur, Jhansi etc.

Fl. March-May. Fr. Oct.-March.

Distribution :—Western Himalaya, Kumaon, Bengal, foot hills and low valleys of the Himalaya from Sikkim eastwards to upper Assam, Bangladesh, Upper Burma.

This species is much confused with *G. multiloculare*. In *G. multiloculare*, however, the fruit is much depressed, distinctly lobed, intruded at both ends, stamens 4-12, connectives very

short; while in *G. assamicum* fruit not much depressed nor intruded at both ends, not deeply lobed when fresh; stamens 3, very rarely 4, connectives umbonate.

Glochidion daltoni Kurz, For. Fl. 2: 344, 1877; Hk.f. in FBI. 5: 320, 1887; Panigrahi et al in Bull. Bot. Surv. Ind. 11 (1 & 2): 99, 1969.

A deciduous small tree or shrub; branches slender, glabrous. Leaves coriaceous, brown on both surfaces when dry or green above, 5-10 cm long, lanceolate or oblong lanceolate, acuminate, shining above, purplish-brown beneath, base cuneate; nerves very slender, raised; petiole about 2 mm; stipules ovate, acute. Flowers sessile; sepals, ovate-oblong, silky within; female sepals glabrous without; style exserted, stout, slightly clavate, tip with 4-6 round-lobes. Capsule subsessile, depressed, 8-10-lobed, reddish-brown.

Nishangarha, Bahraich dist. *Panigrahi* 6526 (specimens not seen).

Distribution :—Sikkim Himalaya at the foot hills, Burma, Yunnan.

Jatropha gossypifolia Linn. Sp. Pl. 1006, 1753; Hk.f. in FBI, 5: 383, 1887; Bor & Raizada in Beautiful Ind. Shrubs & Climbers. 175, 1954; Panigrahi et al in Bull. Bot. Surv. Ind. 11 (1 & 2): 299, 1969.

A shrub up to about 2 m high with rather soft, succulent, brownish-green branches, much scarred when the leaves have fallen away. Leaves 3-5-lobed or partite, lobes glandular-serrate, up to 15 cm long and as much across, stipulate; petiole up to 10 cm long with branched glandular paleae or hairs; stipules capillary, multifid, glandular. Inflorescence a terminal cyme, seated upon a short thick dark-red peduncle. Male and female flowers on the same or different plants. Calyx about 7 mm long, consisting of a short tip with 5-lanceolate gland-margined lobes. Petals hardly longer than the calyx-lobes, dark red, crimson or purple. Stamens 10-12, monadelphous; ovary globular-ellipsoid. Fruit a capsule about 8 mm long, 3-furrowed, truncate at both ends. Seeds greyish-red, marked with black, bearing a caruncle.

Bhingra range, Bahraich, *Sri Ram* 1870; South Lalipur range, Jhansi For. Div. *Sri Ram*; Kalyanpur, Banda dist. *Sri Ram*; Surpur-forest, Gorakhpur Div. *Sri Ram*; Tikri range, Banda For. Div. *Sri Ram* 1871; Abdullaganj, Bahraich dist. *Panigrahi* 6462, 2762, under the shade of trees in forest.

Fl. & Fr. Chiefly rainy season.

Distribution:—Native of Brazil, cultivated or naturalized in various parts of India and Burma.

Jatropha panduraefolia Andr. Bot. Rep. 4: t. 267, 1799;
Jatropha hastata Jacq. Enum. Pl. Carib. 32, 1760; Bor &
 Raizada in Beautiful Ind. Clim. & Shrubs 174, 1954.

An erect, pretty, branched, small shrub. Leaves fiddle-shaped, distantly dentate below, abruptly acuminate, shortly cordate at base, where there are 3-4 glandular teeth on each side, up to 10 cm long, 5 cm wide, dark green on the upper surface, paler or with a purplish tinge below. Stipules small, subulate; petiole up to 3.4 cm long. Inflorescence a small terminal cyme; peduncle purple or purplish-green, slender. Male and female flowers on different plants. Male flowers: calyx small, cup-shaped, 5-lobed, purplish-red, 2.5-5 cm long; petals spatheolate, scarlet, twisted in bud; stamens 8, often 4 long, 4 short; filaments jointed in a column, red; anthers reddish-yellowish, hastate. Disk glandular, 5-lobed. Female flowers: calyx as in the male but longer, petals and disk the same as in male flower; ovary ovoid, glabrous attenuated into a column at the summit; styles 3, bifid from the middle into filiform branches. Fruit a capsule, purplish-green.

Grown in gardens for ornament in the tropics of both hemispheres. Native of Cuba.

Fl. Practically all the year round but chiefly during the rains. *Fr.* Ripen cold season.

Mallotus repandus Muell.-Arg. in Linnaea 34: 197, 1861-62 and in DC. Prodr. 15(2): 981, 1866; Hk.f. in FBI. 5: 442, 1887; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 228, 1939.

A large climbing or straggling shrub, sparingly armed with strong spines. Branchlets tomentose. Leaves 3-10 cm long, 7-8.5 cm broad, glabrous above, covered with amber coloured glands beneath. Flowers dioecious, pale-brown, densely tomentose, distinctly glandular. Capsule of 2 cocci about 1.2 cm across, densely stellate, fulvous and glandular outside; seeds globose about 1.3 cm across, black and rugulose.

Nichland, Gorakhpur, P. C. Kanjilal. Rare.

Distribution:—Throughout India from the tropical Himalaya in Bhutan to Assam and southwards to Travancore and Ceylon, China, Malaya, New Caledonia.

Micrococca mercurialis (Linn.) Benth. in Hook. Niger. Fl. 503, 1849; Pax & Hoffm. in Engl. and Prantl, Pflanzenfam. (ed. 2) 19C: 112; Raizada in Ind. For. Rec. (n.s.) Botany 1(5):

228, 1939; *Tragia mercurialis* Linn. Sp. Pl. (ed. 3) 1391, 1763, excl. Syn. *Claoxylon mercurialis* Thw. Enum. 271, 1861; Hk.f. in FBI. 5: 412, 1887.

An annual herb up to 0.6 m high. Leaves $3-6 \times 2.3-3$ cm, ovate, acute at apex, usually rounded at base, crenate. Racemes equalling or exceeding the leaves. Flowers short or long-pedicelled; the females usually solitary, with several males. Capsules 4 mm in diameter, globose, glabrous or sparsely hairy, deeply 3-lobed, depressed. Seeds pitted.

Bawain, Etawah, *Parker* 2386.

Fl. & Fr. Rainy season.

Distribution:—Bihar, Deccan Peninsula; a weed of cultivated lands—Burma, Ceylon, Arabia and tropical Africa.

Phyllanthus debilis Klein ex Willd. Sp. Pl. 4:582-583, 1804; Hk. f. in FBI. 5:229, 1887; Webster in Journ. Arn. Arb. 38:307, 1957; Som Deva in Bull. Bot. Surv. Ind. 10(2): 181, 1968.

An erect, glabrous, annual herb with a woody base. Stems subterete or obtusely 3-gonous; branchlets slender, compressed, 3-gonous. Leaves on 0.05-0.15 cm long petioles, ovate-elliptic, with an acute or cuneate base, subacute, dark-green above, glaucous on the lower surface, $0.5-2 (-2.5) \times 0.2-0.5$ cm; stipules lanceolate, acuminate, 0.1-0.2 cm long. Male flowers in fascicles; bracts lanceolate, 0.1 cm long; pedicels 0.05-0.1 cm long; perianth-segments 5-6, subequal, 2-seriate, obovate oblong, rounded, subtruncate or retuse, $0.08-0.12 \times 0.03-0.06$ cm; stamens 3, column 0.25-0.04 cm long; disk-lobes 6, glandular, yellowish; female flowers solitary; pedicels 0.1-0.2 cm long; perianth-segments 6, obovate-spathulate, $0.2-0.22 \times 0.08-0.1$ cm; styles free, appressed to the ovary, 0.2-0.3 cm long. Fruit oblate, 1.25-1.3 cm across; seeds brown, longitudinally ribbed with transverse striae between the ribs on the back side. Disk shallowly 6-lobed.

Near I.R.D.E., Dehra Dun, *Raizada*; Mohan Pass, Saharanpur Siwaliks, *Raizada* Dehra Dun Herb. No. 83936; Rajpur, *Saxena* 1050; Rispana, *C.R. Babu* 35476; Sahasradhara, *Som Deva* 2765.

Fl. & Fr. Sept.-Nov.

Distribution:—North-West India, Sikkim & Bhutan Himalaya, Bihar, Assam and Khasi hills, Deccan Peninsula.

This species differs from *P. fraternus* Webster in having elliptic acute leaves, styles spreading and appressed and female disc subentire. Vide Webster in Journ. Arn. Arb. 38:307, 1957.

Phyllanthus fraternus Webster in Contr. Gray Herb. 176: 53, 1955 and J. Arn. Arb. 38:309, t. 19, f. G-H., 1957; *P. asperulatus* Hutch. in Kew Bull. 1920: 27-28; Webster in J. Arn. Arb. 37:14, 1956; *P. niruri* (auct. non Linn. 1753); Hk. f. in FBI. 5:298, 1886 (pro parte); Pax & Hoffm. in Engl. & Prantl, Pflanzfam. (ed. 2): 196, 64.

A branching annual herb, 10-45 cm high. Leaves pallid, elliptic-oblong, 6-17 × 3-9 mm, cuneate to obtuse at the base, rounded or obtuse at the tip, greyish-paler beneath, prominently distichous, so that the branches look like pinnate leaves; petiole about 0.5 mm long; stipules 0.6-1 mm long, lanceolate, scarious, entire, acuminate at apex. Flowers creamy-white, monoecious, small and axillary, with 2 or 3 male flowers in proximal axils and solitary female flowers in succeeding axils. Male flowers: small, yellowish-white; pedicels 0.3-0.6 mm long, glabrous; sepals 6, connate at base, each 0.4-0.7 mm long, subequal, obovate, obovate-elliptic or elliptic, scarious, 1-nerved; petals absent, disc of 6 small minutely lobed obscurely glandular segments alternating sepals; stamens 3; filaments united into a column; anthers 2-celled. Female flowers: pedicels 0.6-1.2 mm long, subterete, glabrous; sepals 6, connate at base, each 0.8-1.2 mm long, slightly unequal, ovate to spatulate, 1-nerved, with broad scarious margins, entire; petals absent; disc irregularly cup-shaped deeply lobed into about 9 or less lacerate segments; ovary ovoid or globular, glabrous; styles very short, free, erect, shortly 2-fid, lobes blunt, recurved. Capsules about 2 mm diameter, globose, oblate, brown, glabrous. Seeds 3-gonous, brown or reddish-brown, with longitudinal regular parallel ribs on the back, sometimes minutely tuberculate.

Rajpur Saxena 1050, Rare; Mohkampur, Dehra Dun, Raizada; Pilibhit, Hamirpur (Mahoba), Bulandshahr, Raizada.

Fl. & Fr. August-Oct.

Distribution:—N.W. India, Kumaon, E. India, Bengal, Andhra Pradesh. Native probably to W. Pakistan and W. India; introduced into Africa and West Indies.

This plant was confused with *Phyllanthus niruri* Linn. in India till Webster (l.c.) established it to be different. Webster (l.c. 53, 1955) raised this into a distinct species *P. fraternus*, but later (Webster l.c., 8, 1956) reduced the same to the status of synonym of *P. asperulatus* Hutch. He (l.c., 311, 1957) in his later work states that *P. asperulatus* differs from *P. fraternus* in "its slightly longer pedicels and especially in its entire female disc and spreading styles" and retains it as a distinct species.

The disc in the femal flower on all plants studied by me is

deeply segmented and hence this plant is treated under *P. fraternus* provisionally, as Webster (l. c. 312, 1957) himself states. However, a thorough study of the "*Phyllanthus niruri*" complex of India and their comparison with the types only can resolve the tangle.

Incidentally another allied species *Phyllanthus amarus* Schum. & Thonn. (Kongl Danske Vidensk. Selsk, Skr. 4:195-196, 1829; Webster in Journ. Arn. Arb. 38:313, t. 19, f. I-K, 1957; *Phyllanthus urinaria* sensu Linn. Sp. Pl. 782, 1753 (excl. type), *P. nanus* Hk. f. in FBI. 5:298, 1887) closely resembles *P. fraternus* and is likely to be confused with the later and in a way this confusion may be the reason for the inadequate knowledge of the distribution of *P. amarus* in India. However, *P. amarus* is characterised by having pairs of male and female flowers in each axil, and this feature together with the shape of the disc (which is flat, deeply 5-lobed in the female flower of *P. amarus* while the disc in the female flower of *P. fraternus* is irregularly cup-shaped, deeply lobed into about 9 more or less lacerate segments) makes its identity fairly easy.

Phyllanthus amarus is stated to be a native of America and so far as at present known occurs in Bihar, West Bengal and according to Hooker (l.c.) in Burma; Africa and West Indies.

Phyllanthus indicus (Dalz.) Muell.-Arg. in Linnaea 32:52, 1858 and in DC. Prodr. 15(2) : 417, 1866; Hk. f. in FBI. 5:305, 1887; *Prosorus indicus* Dalz. in Hook. Journ. Bot. 4:346, 1852; Raizada in Ind. For. Rec. (n.s.) Botany 1(5) : 226, 1939; A.E. Osmaston in For. Fl. Kumaon 475, 1927; *Margaritaria indica* (Dalz.) Airy Shaw in Kew. Bull. 20:387, 1966; Backer & Bakh.f. Fl. Java 3:648, 1968.

A deciduous tree up to 20 m high; branches terete with white spots. Leaves membranous, 9-20 cm long, 4-6.5 cm broad, elliptic or oblong, obtuse or shortly acuminate, entire, glabrous; secondary nerves 8-14 pairs; stipules lanceolate, subserrate. Flowers green, the female 0.3-5 mm in diameter, the male smaller, in clusters mostly below the leaves on the new shoots, appearing with the leaves. Pedicels slender, up to 1.4 cm long in the female and 8 mm in male flowers. Capsule 1.2 cm in diameter, depressed, oblong, glabrous.

Jolasal range, Haldwani Div. *Champion* 6108; Horai (Tarai), Haldwani division, *H. G. Champion*, 36690; Kalagarh Div., *W. J. Lambert*.

The combination *Margaritaria indica* was actually made by Airy Shaw (loc. cit.) not by G.L. Webster as mentioned by Backer & Bakh. f. in Fl. Java 3:648, 1968.

According to *Champion* this species occurs in swamps and bordering streams in Bhabar and sub-Himalayan tract of Kumaon

as far west as Kalagarh division in the Haldwani division. In the Haldwani division it is not uncommon.

Fl. March-April.

Distribution:—Deccan Peninsula; on the Ghats of Concan and Kanara; Ceylon.

According to G. L. Webster this species should be accommodated in *Margaritaria* L.f. The correct name will then be *M. indicus* (Dalz.) G. L. Webster (See also Backer & Bakh.f. in *Fl. Java* 3: 648, 1968) where they also suggest the same.

Sauropus brevipes Muell.-Arg. in *Linnaea* 22: 73, 1849 and in *DC. Prodr.* 15(2): 242, 1866; Hk.f. in *FBI.* 5: 335, 1887; Raizada in *Ind. For. Rec.* (n.s.) *Botany* 1(5): 227, 1939; P.C. Kanjilal *For. Fl. Plains Uttar Pradesh* 614, 1966.

A small, glabrous shrub; branchlets filiform, angular. Leaves 1.5-2.5 cm long, shortly petioled, elliptic, ovate, glabrous. Flowers racemed on a densely bracteate peduncle. Male flowers 1-4 in each axil, glands large. Female flowers mostly in the upper axils, twice the size of female; ovary globose, 3-celled; fruit 0.5 cm across, depressed, globose, containing 6 indehiscent, 3-angled cocci.

Gurhni forest, Gonda division *Sri Ram* 324 & 2154; rare.

Fl. Feb.-June.

Distribution:—Burma.

ULMACEÆ

Celtis tetrandra Roxb. (*Hort. Beng.* 21, 1814) & *Fl. Ind.* 2: 63, 1832; Hk.f. in *FBI.* 5: 482, 1888; Raizada in *Ind. For. Rec.* (n.s.) *Botany* 1(5): 228, 1939.

A large deciduous tree with smooth grey bark. Leaves 6.4-15 cm long, 2.5-5 cm broad, obliquely ovate-lanceolate, dentate acuminate, serrate from above the middle or sub-entire. Flowers small, pale yellowish-green, tetramerous; perianth segments usually 4, elliptic, fringed and woolly on the margin. Ovary pilose at the apex; style 0. Drupe about 0.7 mm across, globose, orange-red when ripe.

Bahraich district, *Inayat* 23840; Dharmawala to Sabhawala, *H. H. Lace* 3086; Sitabani, Ramnagar division, *A. E. Osmaston* 1179; Dehra Dun, *Raizada, Parker*.

Fl. Feb.-March.

Distribution:—The Salt Range and the lower outer

Himalaya from Murree to Nepal, Sikkim, Khasi Mts., Bihar, Deccan Peninsula, Bangladesh, Malaya.

This species differs from *Celtis australis* L. mainly in having leaves serrate from above the middle or sub-entire and globose orange-red drupes; leaves being coarsely serrate from near the base and drupes ellipsoid, purplish black in *C. australis*.

URTICACEÆ

Neodistemon indicum (Wedd.) Babu & Henry n Taxon 19: 651, 1970; *Distemon indicum* Wedd. Monogr. 9: 551, t.20A, 1856; Hk.f. in FBI. 5: 588, 1888; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 230, 1939; Backer & Bakh.f. Fl. Java 2: 48, 1965.

An erect slender annual herb about 60 cm high; stem thinly hairy, subquadrangular, deeply grooved when dry. Leaves alternate, petioled, coarsely toothed, broadly ovate, $2-10 \times 2-6$ cm, 3-nerved at the base, patchy beneath with whitish, cobwebby pubescence between the hairy nerves giving a mottled appearance, cystoliths punctiform. Flowers monoecious in small bracteate, 3-flowered, andragynous clusters forming slender axillary and long terminal spikes 10-15 cm long. Bracts ovate, acuminate. Perianth of male campanulate 2-3-fid, valvate; of female tubular, ventricose. Stamens 2-3. Pistillode woolly. Ovary included in and more or less adnate to the perianth. Achenes broadly ovoid, about 0.3 cm long, beaked, longitudinally obtusely ribbed, enclosed in the thick fleshy or crustaceous perianth.

Nakraunda, Dehra Dun, Raizada Dehra Dun Herb. No. 75162; Laxman Siddh, Dehra Dun, S.K. Malhotra 17356; Corbett Park, P.C. Pant 43204, 43038; Rajaji Sanctuary, near Mohand, J.V.S. Rao 39827; Ranipur, Manipur Range, Banda Div., Sis Ram Dehra Dun Herb. No. 142972, 142973 and 142974.

Fl. & Fr. Rainy season.

Distribution:—Upper Gangetic Plain and from Assam, Bihar southwards and Andhra Pradesh; Burma, Java.

The generic name *Distemon* Wedd. (in Arch. Mus. Par. 9: 550. t. 20, A, 1856) is illegitimate by being a later homonym of *Distemon* Bouche (in Linnaea 18:494, 1844), and had to be rejected according to Art. 64 of I.C.B.N. (1972). Since it is a monotypic genus with a weedy species, conservation of the generic name *Distemon* Wedd. against *Distemon* Bouche was considered unnecessary, and since there was no other published name for

this taxon, Babu & Henry (loc. cit.) proposed the above generic name, *Neodistemon* for *Distemon* Wedd. 1856, non Bouche 1844).

Elatostemma surculosum Wight, IC. 6:35, t. 2091, f. 4 1850; Hk. f. in FBI. 5:572, 1888; Som Deva in Bull. Bot. Surv. India 10(2) : 181, 1968.

An erect herb, 2.5-15 (-20) cm long. Leaves alternate, often with a small subopposite leaf, sessile or subsessile, falcate-oblongate or ovate-lanceolate, 8-25 mm long, the lower ones entire, the upper coarsely dentate towards the tip. Flowers greenish, minute, monoecious or dioecious, crowded on sessile, saucer-like, 1-sexual, axillary receptacles.

Rajpur, Saxena 1072 (B); Mohand Pass, Raizada, Som Deva 1091; New Forest, Dehra Dun, H.B. Naithani 2463.

Fl. & Fr. Aug.-Oct.

Distribution :—Himalaya 900-2100 m, Assam, from Simla to Nilgiri Mts., Ceylon.

Laportea interrupta (Linn.) Chew in Gard. Bull. 21:200, 1965; *Urtica interrupta* Linn. Sp. Pl. 985, 1753; *Fleurya interrupta* (L.) Gaud. Freyc. Voy. Bot. 479, 1826 (1830); Hk. f. in FBI. 5:548, 1888; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 229, 1939.

An erect herb, 10-40 cm tall; stems flexuous, terete, furrowed; entire plant covered sparingly with stinging hairs. Leaves 3.5-9.5 × 2.3-7.5 cm, broadly ovate, alternate, crenate-serrate along margins, sparingly clothed with bulbous-based stinging hairs on both surfaces; acuminate, cordate, shortly cuneate or sub-truncate at base, 3-nerved; petiole 1-8 cm long, slender, hairy; stipules 2-4.5 mm long, 2-fid at apex, segments linear-subulate, acuminate-aristate at apex. Flowers greenish, in distant paniculate cymose monoecious clusters; cymose clusters arranged in 1.5-16 cm long interrupted axillary racemes; peduncles 1-5.5 cm long, grooved, hairy. Male flowers: pedicels 0.4-1 mm long thick; perianth 1-1.2 mm long, 4-lobed to the base; stamens 4, inflexed in bud; pistillate clavate. Female flowers: pedicels about 0.5 mm long, decurved, hairy; perianth 0.8-1 mm long, 4-toothed, upper tooth hooded, lower minute, each more or less deltoid, ciliolate along margins, acute at apex; ovary oblique, much compressed, ovate in outline, keeled or narrowly winged along margins, with downwardly curved style at apex, more or less truncate at base, straw-brown.

Dehra Dun, Parker, Raizada;

Fl. August-Jan. Fr. Sept.-Jan.

Distribution :—Khasi hills, W. Bengal, Bihar, Western Peninsula, Ceylon, Malaya, Pacific Islands, China, Abyssenia.

This plant is an abundant weed on garden wastelands. Chew (l. c., 199) has reduced the genus *Fleurya* treating it as cogenetic with *Laportea* and has kept it as a section under the later.

Pilea scripta (Buch.-Ham. ex D. Don) Wedd. in Ann. Sci. Nat. (Ser. 4) 1:187, 1854 et in Monogr. 222, 1856; Hk. f. in F.B.I. 5:556, 1888; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 229, 1939; *Burrica scripta* Buch.-Ham. in D. Don, Prodr. 59, 1825.

An erect glabrous herb, 30-120 cm high. Leaves opposite, petiolate, lanceolate, lamina 7-20 cm long, serrate-dentate; teeth small. Flowers monoecious or dioecious, in clusters on slender branches of stalked spreading axillary panicles. Achenes rough.

Dehra Dun, Duthie 2632; Robber's Cave, Dehra Dun, Gamble 24524; Lachiwala, Hole, Raizada; Bidholi, Dehra Dun, Sohan Lal.

Pilea symmeria Wedd. in Ann. Soc. Mus. Par. 8:246, 1855-56 et Monogr. Urt. 246, 1856; Hk. f. in F.B.I. 5:554, 1888; Hand.-Mazz. Symb. Sin. 7:122 et 133, 1929; Hara, Fl. E. Himalaya 62, 1966; Naithani & Raizada in Ind. For. Vol. 103 (in press).

An annual herb. Stems 30-90 cm high, glabrous. Leaves membranous, 5-15 cm long, ovate-oblong or ovate-lanceolate, caudate-acuminate, coarsely serrate, 3-nerved, base rounded or notched; petiole 2.5-7 cm long. Stipules small, deciduous. Cymes variable, when large paniculately branched; peduncles 1-7 cm. Flowers monoecious or dioecious. Male flowers 3 mm in diameter, scattered. Achenes 2 mm or less, sometimes a faint intramarginal rough line, smooth, edge acute.

New Forest, Dehra Dun, Raizada s.n., H.B. Naithani 7193, 7199.

Fl. & Fr. Oct.-Nov.

Distribution ;—Temperate Himalaya from Kumaon to Sikkim and Khasi hills; West & South China, Hong Kong.

This species is near *Pilea scripta* (Buch.-Ham. ex D. Don) Wedd. In this species, however, the leaves tend to be coarsely serrulate and ovate, often minutely sinuated at the base while *P. scripta* has elliptic leaves, minutely and also depressedly serrulate. Moreover the achenes in this species are much larger than those of *P. scripta*.

Pouzolzia hirta (Bl.) Hassk. Cat. Hort. Borger 80, 1844;

Hk.f. in FBL 5: 586, 1888; Collett, Fl. Sim. 468, 1901; S.K. Malhotra in Maharashtra Vidyan Mandir, Patrika 6(1): 42, 1971; *Urtica hirta* Bl. Bijdr. 495, 1825; *Gonostegia hirta* Miq. Ann. Mus. Bot. Lud. Bat. 4: 303, 1869.

A slender decumbent or suberect herb 15-90 cm high. Leaves opposite, in distant pairs, sessile or subsessile, ovate or ovate-lanceolate, 2.5-10 cm long, entire, pointed. Flowers 1-sexual, pinkish or orange, in small axillary clusters. Male perianth 5-parted. Stamens 5.

Sahasradhara *Raizada* s.n.; Sahasradhara, along rocky slopes, S. K. Malhotra 33937.

Fl. & Fr. July-Sept.

Distribution :—Tropical and sub-tropical Himalaya, China, Malaya Islands, Australia.

Urtica parviflora Roxb. Fl. Ind. 3: 581, 1832; Hk.f. in FBL 5: 548, 1888; Raizada in Ind. For. Rec. (n.s.) *Botany* 4(3): 72, 1950,

An erect herb, 1-2.3 m high, more or less beset with stinging hairs. Leaves opposite, ovate or lanceolate; lamina 5-10 cm long, irregularly toothed. Flowers small, green, monoecious, clustered on the branches of loosely spreading axillary panicles. Perianth 4-parted; stigma resembling a tuft of hairs. Achenes orbicular, flattened.

Dehra Dun. *Gamble* 24661, *Raizada*; Rajpur, *Saxena* 225; New Forest, Dehra Dun, H. B. Naithani Ser. II, No. 85.

Common near villages and at times in the forest in moist places, *Raizada*.

Fl. & Fr. Sept.-Feb.

Distribution :—Temperate Himalaya from Kashmir to Mishmi hills, Nilgiris.

MORACEÆ

Ficus clavata Wall. ex Miq. in Ann. Mus. Bot. Lud. Bat. 3: 275, 1867; Hk.f. in FBL 5: 520, 1888; King in Ann. Roy. Bot. Gard. Calcutta, 275, 1887; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 72, 1939.

An erect shrub; shoots scabrid. Leaves alternate, short petioled, membranous, 10-15 cm long, oblong-lanceolate or oblanceolate, cuspidate or caudate, glabrous, coarsely toothed above the middle, 3-5-nerved, nerves prominent, harsh punctulate beneath; stipules lanceolate, caducous about 7 mm. Recep-

tacles shortly peduncled, axillary, dimorphic, obovoid and subglobose, about 1.5 cm across. Female receptacles smaller than those with male and gall flowers. Male and gall flowers 5-6-cleft, broadly ovoid. Female flowers campanulate, 5-toothed; achenes ovoid, subpapillose; style subterminal, elongate; stigma cylindric.

Dehra Dun, *Raizada*, *Duthie* 10709; Lakhond, Dehra Dun, *Gamble* 25672.

Fl. & Fr. Cold season.

Distribution.—Lower hills of the Himalayas from Sutlej to Bhutan, Manipur, Khasi Mountains; Burma and Malacca.

Ficus oligodon Miq. in Ann. Mus. Ludg. Bat. 3: 234, 297, 1867; *Ficus pomifera* Wall. ex King in Ann. Roy. Bot. Gard. Calcutta 1: 171, t. 215, 1887; Hk.f. in FBI. 5: 535, 1888; *Raizada* in Ind. For. Rec. (n.s.) *Botany* 1(5): 229, 1939.

A medium-sized tree with white bark. Leaves 12.5-22 × 7.5-13 cm, coarsely serrate, with 4-5 pairs of primary nerves; petiole 3.7-8.6 cm long. Receptacles on tubercles on leafless branchlets, long-peduncled, globose, 4-6 grooved, pubescent, red when ripe.

Kheri Swamp, Dehra Dun District, *Raizada*, *P.C. Kanjilal*; Gola Tapper, Dehra Dun District, *Raizada*, *Osmaston*; Gola Tapper Swamp, Dehra Dun, *S. M. Arora* 3887.

Ficus tsiela Roxb. Fl. Ind. 3: 549, 1832; Hk.f. in FBI. 5: 515, 1888; King in Ann. Roy. Bot. Gard. Calcutta 1: 59, t. 74, 84, 1887; *Raizada* in Ind. For. Rec. (n.s.) *Botany* 1(5): 72, 1939.

A large spreading tree without aerial roots, all parts glabrous. Leaves 5-12 cm, coriaceous, broadly ovate or ovate-lanceolate, acute or broadly obtusely cuspidate, entire with a thickened marginal nerve, base narrowed or rounded, 3-nerved; petiole 3-5 cm, stipules ovate, acuminate. Receptacles crowded at the ends of the branches, axillary or at leaf-scars, sessile, globose, purplish, smooth when ripe, about 1.2 cm across, basal bracts 3, minute, broadly ovate, scarious. Male flowers: few, sessile; sepals 3 ovate, acuminate, longer than the single stamen; anthers broadly ovate, filaments longer, thick. Gall flowers: sessile or pedicelled; females mostly sessile; sepals of both 3, ovate, shorter than the achenes; fertile and gall achenes ovate-reniform, fertile broadest, style in both long, stigma cylindric.

Ajmer, *A. E. Laurie* 4882, Suna, Deori Range, Saugor, *D. O. Wilt* 116.

Duthie (vol. 3 pt. 1. p.161) mentions that it is found in the Ajmer district as a planted tree. I am convinced that it is doubtless indigenous there as it is admitted to be native and sometimes common in the Central Provinces (Madhya Pradesh), immediately south of our area.

JUGLANDACEÆ

Engelhardia spicata Leschen. ex Bl. Bijdr. 528, 1825 var. *colebrookiana* (Lindl. ex Wall.) O. Ktze. Rev. Gen. 1: 637, 1891 (non K. & V. Bijdr. 5: 169, 172, 1900); Jacobs in Fl. Males. (Ser. 1) 6: 153, 1960; Backer & Bakh.f. Fl. Java 2: 158, 1965; S.K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6(1):42, 1971; *Engelhardtia colebrookiana* Lindl. ex Wall. Pl. As. Rar. 3: 4, t. 208, 1832; Hk.f. in FBI. 5: 596, 1888.

A deciduous tree, about 10-20 m high. Leaves imparipinnate; leaflets 6-11, subopposite, subsessile or shortly petiolulate, obovate or elliptic-oblong, entire, usually obtuse. Flowers unisexual, monoecious. Male spikes solitary or 3-5-together, arranged racemously on a rachis. Female spikes solitary or terminating the racemes of male spikes; bracts unequally 3-lobed. Nut small, globose, adnate to the much enlarged 3-lobed bracts.

Sahasradhara, along the slopes, S.K. Malhotra 27631.
Fl. & Fr. April-June.

Distribution:—Throughout the Himalaya, ascending to 1800 m. Khasi Mts.; Burma, S. China, Hainan, S.E. Siam, Indo-China, Philippines, Java.

This species occurs in the mixed deciduous forests in Mussoorie at Katapathar. I have not seen or collected it from Sahasradhara, possibly Malhotra's specimen is collected from a higher elevation than 900 m and as such does not fall within the limits of the region of this flora.

The original spelling is *Engelhardia* not *Engelhardtia*.

GNETACEÆ

Ephedra foliata Boiss. Fl. Orient. 5: 716, 1881. var. *ciliata* (C.A. Mey.) Stapf; Raizada in Ind. For. Rec. (n.s.) Botany 4(3): 72, 1951.

A tall scandent shrub, stem up to 8 cm in diameter, bark on the branches exfoliating in fibrous shreds. Branches very slender often filiform, dull green, usually whorled, internodes 2.5-10 cm long; leaf-sheaths short, often bearing 2-4; linear-setaceous blades; blades sometime 2.5 cm long but usually 2-6

cm long. Male spikes ovate, solitary or 2-3 together, sometimes with a peduncle 2.5-4 cm long; flowers 6-24, bracts rotund, obtuse, connate, 1.4-2 cm long; staminal column equalling the perianth or shortly extended; anthers 3-4. Female spikes often in small cymes, pedunculate, flowers usually in pairs; tubilus exserted, short, straight. Fruit ovoid about 8 mm, white, translucent showing 2 dark-coloured seeds.

Budha Pushkar, Ajmer, *Brahma Dutt Tyagi* Dehra Dun Herb. No. 101125. Climbing on *Euphorbia nerifolia*.

Fl. & Fr. Jan.-March.

Distribution :— Punjab plains mainly in the southern portion; common at Changa Manga, Baluchistan. Sindh, Salt Range.

HYDROCHARITACEÆ

Blyxa echinosperma (Clarke) Hk. f. in FBI. 5:661, 1888; Hartog in Fl. Males. (Ser. 1) 5:391, f. 6a, 1957; Subramaniam in Aq. Angiosp. 59, 1962; Murty & Singh in Sci. & Culture 30 (3): 150, 1964; *Hydrotrophus echinospermus* Clarke in Journ. Linn. Soc. Bot. 14:8, t. 1, 1875; *Blyxa lancifolia* Hk. f. in FBI. 5:661, 1888; *B. talboti* Hk. f. in FBI. 5:661, 1888.

A submerged tufted, stemless, scapigerous, hermaphrodite annual. Leaves up to 120 cm, linear, acute, entire. Flowers bisexual, solitary, sessile in a tubular spathe, bifid at the apex; stamens 3; capsule 5-7.5 × 5 cm., terete; seeds with 8 rows of blunt spines and with a 1-5 mm long filiform tail at both ends.

Near village Badripur, Dehra Dun Dist., Murty & Singh 1963.

Fl. & Fr. Aug.-Oct.

Distribution :— Madhya Pradesh, Bengal, Assam, South India.

ORCHIDACEÆ

Eulophia graminea Lindl. Gen. et Sp. Orch. 182, 1933; Hook. f. in FBI. 6:2, 1890; King & Prantl. in Ann. Roy. Bot. Gard. Calc. 8:176, Pl. 238, 1898; C.L. Malhotra in Bull. Bot. Surv. Ind. 8:77, 1965.

A terrestrial orchid with tough fibrous roots. Pseudobulb large, thick, obpyriform, partly epigeal, green, 8-10 cm long and up to 4.5 cm thick at the broadest part, crowned at the top with older sheathing leaf bases, deciduous when flowering. Scapes lateral, one to many, glabrous, 50-60 cm long, branched. Flowers racemose; pedicels 1-1.5 cm, distinct, glabrous, bracteate; bract

triangular 1-2 cm, base broad, 0.75-1.5 cm tapering to the acute apex, veins many, dark brown; bracteoles 8 mm by 2 mm, acute. Sepals dull green, 1.3 cm by 0.2 cm, elliptic lanceolate, acute, with reddish brown veins. Petals slightly broader. Lip 3-lobed, white, cylindrically spurred, spur 2 mm, with slightly swollen tip; side lobes 0.3 cm by 0.2 cm, blunt; middle lobe 0.6 cm by 0.5 cm, rounded and bluntly apiculate, with 5 pink fimbriate ridges on the upper surface, hairs more in the middle, margins wavy. Column with a short foot. Pollinia exposed below the anther. Fruit glabrous, yellowish green, 2 cm long, 0.7 cm broad, elliptic oblong, drooping.

Chandanchoki, Lakhimpur-Kheri Dist. (on Indo-Nepal border), growing amidst clumps of *Saccharum* and *Imperata* on the Mohana river bed, C.L. Malhotra 31544.

Fl. & Fr. April.

So far reported only from South India, Bengal and Assam, Travancore, Nicobars; Ceylon, Burma.

Enlophia ramentacea Lindl. ex Wight, Icon. 5(1): 8, t. 1666, (non Lindl. 1858); Santapau & Kapadia, Orch. Bombay 113, 1966, t. 28; *Eulophia pratensis* Lindl. in Journ. Linn. Soc. 3:25, 1858; Dalz. & Gibs. Bom. Fl. 264, 1861; Hk. f. in Fl. Br. Ind. 6:4, 1890; Cooke Fl. Bom. 694, 1907; Fyson, Fl. Nilg. Puln. Hill Tops 393, 1915 & t. 513, 1920; Fischer in Gamble, Fl. Madr. 1435, 1918; *Graphorchis pratensis* (Lindl.) O. Kuntze, Rev. Gen. Pl. 2:662, 1891.

A terrestrial orchid up to 1 m tall with pseudobulbs; pseudobulbs shortly pyramidal or irregularly 3-cornered. Leaves 2-4, appearing before the flowers, usually withering at the time of flowering, 11-30 × 1-2 cm, narrowly oblong-lanceolate, acute; scape 17-48 cm long, erect from the top or side of the pseudobulb, 2.5 mm in diameter, terete, 1-2-noded, pale green or at times tinged with purple. Bracts unequal, ovate to lanceolate, acute, entire, purplish-green. Flowers 2.5 × 3 cm. Bracts persistent, 1-1.5 × 0.3-0.5 cm, equal to or slightly longer than pedicels, oblong or oblong-lanceolate, acute, entire, glabrous, 7-nerved, pale purplish green. Sepals and petals subequal, pale maroon suffused with varying amounts of yellow, acute, entire, glabrous, faintly 3-5-nerved; sepals spreading, oblong, 1.7-1.8 × 0.4-0.6 cm, mid nerve somewhat prominent below; petals 1.6 × 0.6-0.7 cm, oblong-elliptic, mid nerve not prominent below. Lip 3-lobed, 13 mm long, 6-7 mm broad at the mouth between lateral lobes; lateral lobes 11 × 6 mm, erect, light yellow, subfalcately oblong, obtuse; midlobe 6 × 5 mm, ovate-oblong, or suborbicular, mucronulate, entire, yellow; disc of the lip with 3 central, crestical, yellow nerves, ending on 3 rows of deep yellow papillae on the middle.

Spur 4-6 mm long, maroon-yellow, incurved, sharply conical from a broad mouth. Column $9 \times 3-4$ mm, greenish white, slightly tinged with pale maroon on the dorsal surface, oblong, subclavate, footless and wingless. Anther orbicular, white with a maroon epiculum, the anterior lip truncate; pollinia 1×1 mm, oblong-orbicular, posteriorly foveolate, caudicle 1-1.5 mm long; gland narrow, 2 mm long, transversely placed. Stigmatic caudicle, 1-1.5 mm long; gland narrow, 2 mm long, transversely placed. Stigmatic surface pale-green, oblong-orbicular. Capsule 3×1.7 cm, drooping, obovate-oblong, greenish-purple with 3 strong longitudinal bands which are about 3 mm broad; pedicels 1 cm long, recurved.

Mala Swamp, Pilibhit, Sept. 2, 1972, C.L. Malhotra 50678.

Fl. Sept.-Dec. Fr. March.

Distribution :—Gujarat, W. Ghats, Deccan, N. Kanara.

Herminium lanceum (Thunb. ex Sw), J. Vuyk in *Blumea* 11(1) : 228, 1961; Backer & Bakh. f. *Fl. Java* 3:248, 1968; *Ophrys lancea* Thunb. ex Sw. *Kongl. Vet. Akad. Handl. Stockh.* 21:223, 1800; Willd. *Sp. Pl.* 4, 1:64, 1805; *Satyrium lanceum* (Thunb. ex Sw.) Pers. *Syn.* 2:507, 1807; *Aceras angustifolium* Lindl. *Bot. Reg. Sub. t.* 1525, 1882; *Herminium angustifolium* (Lindl.) Benth. ex Hook. f. *FBI.* 6:129, 1894; *Spiranthes lancea* (Thunb. ex Sw.) Backer, Bakh. f. & Van Steenis in *Blumea* 6(2) : 361, 1950 quoad comb. tantum, exclus. *Synon.* non *Spiranthes sinensis* (Pers.) Ames. *Spiranthes sinensis* sensu Raizada in *Ind. For. Rec. (n.s.) Botany* 4(3) : 72, 1950 non *Spiranthes sinensis* (Pers.) Ames. *Orch.* 2:53, 1908 *Orch.* 464, 1840.

A terrestrial orchid, up to 45 cm high, at times almost tuberous. Leaves very variable 2.5-13 cm, on the base of the flowering stem, linear-lanceolate or linear obtuse or acute or oblanceolate, rarely oblong and sessile, often scattered and lower long-petioled. Spikes slender, 7.5-15 cm, twisted, glandular-pubescent; flowers secund, close-set; perianth about 6 mm long, horizontal, reddish or white; sepals obtuse, tips recurved; bracts ovate exceeding the ovary, lip oblong crisped, base saccate, 2-glandular, tip dilated, retuse or apiculate, disk hairy.

Chandrabani, Dehra Dun, Raizada Dehra Dun Herb. No. 81272; Near Dakra, Dehra Dun, May 1881, W. Gollon.

Fl. & Fr. Rainy season.

Distribution :—Throughout India from the Punjab and W. Tibet to Upper Assam and Southwards to Ceylon. Afghanistan, N. Asia, China, Java, Australia.

Herminium monophyllum (D. Don) P.F. Hunt & Summerhayes in *Kew Bull.* 20 (1) : 51, 1966. S.K. Malhotra in

Maharashtra Vidnyan Mandir, Patrika 6(1): 43, 1971 *Neottia monophylla* D. Don, Prodr. Fl. Nep. 27, 1825; *Hermidium gramineum* Lindl. in Wall. Cat. 7413, 1830 nom. nud. et Gen. & Sp. Orchid 305, 1833; Hk. f. in FBI. 6:131, 1890.

A very slender 1-leaved plant. Leaves linear, acute, as long as the scape or longer. Spikes 2.5-9 cm, lax-flowered; rachis striated with rough ridges. Flowers minute secund suberect; bracts subulate equalling the ovary. Perianth about 3 mm across; dorsal sepal oblong or broadly ovate, lateral ovate, obtuse, spreading; petals as long as sepals, obtuse, thick; lip flat, with a concave base, variable in breadth, slightly saccate beneath; anther cells parallel; pollinia subglobose, caudicles short, glands large, shining coriaceous brown; stigmatic processes low; restellum very large, as long as the anther, recurved, retuse, fleshy.

Sahasradhara, Raizada; Sahasradhara, along rocky crevices, S.K. Malhotra 33910.

Fl. Rainy season.

Disiribution :—Western & Central Himalaya, Nepal, Kumaon & Garhwal.

Nervilia crispata (Bl.) Schltr. in Bot. Jahrb. 45: 402, 1911; A. Sathyanarayana Rao in Bull. Bot. Surv. Ind. 5(1): 63, 1963; Backer & Bakh.f. Fl. Java 3: 261, 1968; *Pogonia crispata* Blume, Mus. Bot. Lugd.-Bat. 1:32, 1849; *P. praininana* King & Pantling in Journ. As. Soc. Beng. 62(2): 129, 1898 and in Ann. Roy. Bot. Gard. Calc. 8 (part 1): 267, t. 35, 1898. *Nervilia monantha* Blatt. & McCann in Journ. Bomb. Nat. Hist. Soc. 35: 724, 1932; Fischer in Fl. Prés. Madras 3: 1305, 1957 (Rep. ed.): Santapau & Kapadia in Journ. Bom. Nat. Hist. Soc. 58(2): 337-338, t.31, 1961 et in Orchids of Bombay 130, 1966; Som Deva in Ind. For. 95(4): 269, 1969; C.L. Malhotra in Bull. Bot. Surv. Ind. 11 (1&2): 208, 1969.

A monanthous, hysternanthus, monophyllous, tuberous herb. Tubers 10-20 mm in diameter, subglobose, brown, warty with several root-knobs. Leaf broadly funnel-shaped on opening, later spreading on ground, at maturity flat, orbicular-cordate, appearing after the flowers; petiole 2-4 cm long; lamina 2-12 cm in diameter, orbicular-cordate or subreniform, uniformly green, subplicate and velvety with short, glandular, greenish-white hairs on upper surface, glabrous below, the hairiness is more prominent when the leaf is freshly expanded, 5-12-ribbed, the ribs radiating from the base, distinct on upper surface, obscure on the lower. Scape 5-10 cm long in flower, up to 25 cm in fruit, 1-flowered, pale pink with 2-3 acute or subacuminate pale pink, wide-mouthed sheaths. Flowers faintly fragrant, terminal with an erect labellum, and spreading sepals and petals on

blossoming, becoming folded and nodding later. Bracts small, triangular, acute, about 2 mm long. Sepals and petals similar, greenish-white, often rose tinged, linear-oblancoolate, broader above the middle, tapering to the base, entire, acute; mid nerve subcarinate below with 1-2 pairs of faint lateral nerves. Sepals $17-22 \times 3-5$ mm, 5-nerved, subconcave. Petals slightly shorter and narrower, 3-nerved. Lip 18-20 mm long, scarcely saccate, more or less tubular, obscurely 3-lobed; lateral lobes connivent around the column, narrow-oblong, entire; mid-lobe 3-4-lobulate, lateral lobules entire or subentire, slightly divergent, the middle one obscurely 2-lobed or entire. Lip pink, white at base with 3 main nerves at the centre giving off papellate, purplish, hairy outgrowth on the mid-lobe, the basal nerves on the mid-lobe also somewhat hairy. Column $7-9 \times 2$ mm broad and clavate, flat in front, rounded behind, glabrous, walls of the clinandrium denticulate. Anthers 2×1.5 mm, squarish. Ovary 5×2 mm long, 3-ribbed, oblong-ovoid; pedicel 2 mm long, convex. Capsules 21-7 mm, decurved, broadly fusiform, 6-ribbed; beak 5-7 mm long.

Gular Ghati 550 m, Dehra Dun Dist., *Som Deva* 263, growing in deep shade on the edge of a swamp in black decomposed, humus. Very rare; Bibiwala Forest, near Rishikesh, 300 m, C.L. Malhotra 38302; Nakraunda, *Som Deva* 5023; Kansrao, Dehra Dun, Sept. 1900, *Harsukh* 24193 (DD) is probably this species. It is in leaf only.

Fl. June-July; in leaf Aug.-Nov.

Distribution:—From Sikkim Himalaya and Southwestern India 600-1200 m, North Kanara (Dandeli, Yellapur, Coorg, Mercara), Biligirirangan hill; Tirthahalli, (Shimoga Dist.); Java, New Guinea.

Nervilia infundibulifolia Blatt. & McCann in Journ. Bom. Nat. Hist. Soc. 35: 725, t. 3, 1932; Santapau in Rec. Bot. Surv. Ind. 16(1): 304, 1953; *N. hallbergii* Blatt. & McCann. *ibid* 726, 1932; Santapau & Kapadia in Journ. Bom. Nat. Hist. Soc. 58: (2): 336-337, 1961 and in Orchids of Bombay 127-130, t. 31, 1966.

A terrestrial, tuberous herb with a single leaf. Tubers sub-globose, slightly flattened above, sparsely covered with small root-knobs, 8-10 mm across. Leaf flat on ground or slightly above surface, appearing after flowering; sheaths about 1-2 cm long, light brown, translucent, oblong, acute to subacuminate, entire, purple-nerved; petiole 2-4 cm long, dark-brown purple above, turning lighter below, terete, grooved, ridged, opening into a slightly enlarged funnel-shaped mouth at the base of the lamina; lamina $2-3 \times 3-4$ cm, glabrous, broadly ovate, cordate to suborbicular, subacute, obtuse, or slightly retuse at

the apex, margins brown-maroon, crimped, irregularly and minutely dentate-crenulate; nerves 5-7, very rarely 9 pairs, the last pair generally thin; upper surface dark grass-green with broad chocolate-coloured bands along the nerves, broadening in the middle but not reaching the margin; lower surface light green with prominent dark-brown nerves, corresponding to the depressed ones above. Inflorescence 1-flowered; scapes 6-15 cm (often reaching 26 cm in fruit), tall, terete, pale maroon, of 2 internodes; sheaths linear-oblong, obtuse, entire, 5-nerved, the upper sheath about 3-3.5 cm long, wide-mouthed, the lower much shorter, closely appressed. Flowers almost at right angles to the scape or nodding, greenish-purple. Bracts 3-7 \times 2-3 mm, 3-nerved, maroon, the nerves deeper in colour. Pedicels 1-1.5 mm long, curved, pale-purple. Sepals & petals similar, light maroon-green with maroon veins, linear-lanceolate, broader in the middle, acute, entire, glabrous. Sepals 13-15 \times 3-4 mm, 3-nerved. Petals 12-14 \times 2-2.5 mm, sparsely or not at all gland-dotted, 3-nerved, the mid-nerve more prominent. Lip 16-17 \times 5-6 mm, saccate at base, gland-dotted, 3 lobed; lateral lobes 8 \times 2 mm, pale apple green, acute or subobtusate, entire, more or less embracing the column to form a tube, the latter about 3 mm broad at the mouth, narrower behind, midlobe 9-10 \times 6-7 mm broadly obovate to even suborbicular, rounded (rarely subretuse) at the apex, the margin somewhat wavy, deflexed on the sides, minutely denticulate; the mid-lobe white or pink suffused irregularly all over with more or less deep patches of rose-maroon, the midnerve callus-like, white. Column 8 mm long, broad at the top, 1 mm below, straight, flat in front, rounded behind, pale apple green with at times faint red-maroon narrow longitudinal streaks. Anthers 3 \times 2 mm white or faintly tinged with purple-maroon in front; pollinia 2, in the shape of a broad exclamation mark. Stigmatic surface large, longer than broad, occupying the whole of the enlarged top portion of the column. Ovary 4-5 \times 3 mm, maroon, 6-keeled with alternate low and high ridges. Capsules 18 \times 6 mm, elliptic, maroon.

Rajpur, *Raizada* s.n.: Near Rajpur from the base of hillock at an altitude of 850 m, *Som Deva* 2619, growing in the shade of 'Sal' trees on western slopes, in humus rich clay soil. Very rare.

Fl. July.

Distribution :—North Kanara, Konkan and Western Ghats.

Tropidia curculigoides Lindl. Wall. Cat. 7386 A, 1831 et Gen. & Sp. Orchid. 9497, 1840; Rolla S. Rao & K.K. Ahuja in Bull. Bot. Surv. India 10(3 & 4) : 365 366 fig. 13-16, 1968;

Holtum Fl. Malaya 1:143, 1964; Som Deva & Arora in Ind. For. 97(12) : 699, 1971; Hook. f. in FBI. 6: 93, 1890; *T. assamica* Blume, Fl. Orch. Ind. 124, t. 41, f. 2, 1864; *Cemidia bambusaefolia* Thw. Enum. 314, 1861; Hk. f. in FBI. 6:94, 1890; King & Pantling Ann. Roy. Bot. Gard. Calc. 8:275, t. 366, 1898. *Tropidia* Sp. (King in Herb. Calcutta) ex Hk. f. l.c. 94.

Terrestrial herb, erect with branching stem, 25-50 cm long. Root fibrous. Leaves with sheathing petiole, elliptic, tapering to each end, many nerved, 8-15 cm long and 1.5-3 cm broad. Flowers in small terminal or leaf opposed sub-globose bracteate spikes. Bracts ovate, lanceolate, equalling the sessile ovary. Sepals subconnivent, lanceolate, acuminate. Petals as long as sepals, ovate-lanceolate, mid rib on outer surface prominent. Lip narrowly oblong, without side lobes, tapering to the apex, reflexed. Column stout, broadly triangular. Anthers fleshy. Pollinia two, narrowly elliptic; caudicle short, pubescent, the gland small. Capsule cylindric clavate.

Leafing, flowering and fruiting, May to Aug. Golatappar Swamp forest, Som Deva 4184, 8th May 1969; Arora BSI. NC. No. 38869, 4th July 1969.

In Dehra Dun Valley *Tropidia curculigoides*, has a very localised distribution and is found only at Golatappar Swamp. In all probability it represents a part of once very extensive flora which extended all along the base of the Himalaya, but is now in changed circumstances restricted in favourable habitats only.

Distribution:—Bihar, W. Bengal, Sikkim, Assam, Manipur, Andamans, Kerala and Burma, Ceylon, Bangladesh.

SCITAMINEAE

Hedychium spicatum Hamilt. ex Smith in Rees Cyclop. 17. n 3, 1881; Baker in Hk.f. FBI. 6: 227, 1892; S. K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6(1): 43, 1971.

A perennial, root horizontal. Stem robust, leafy of 15 cm tall. Leaves sessile, broadly lanceolate, 18-36 cm \times 0.7-5-10 cm, ending in a tail-like tip. Spikes dense flowered 15-25 cm, bract 1-flowered, green, oblong, obtuse; inner bracts shorter, membranous; flowers fragrant. Calyx membranous slit on one side, 3-toothed. Corolla-tube 5-8 cm, longer than the calyx; lobes 4 cm, linear, spreading, pale yellow. Lateral staminodes about 4 cm, linear-spathulate, spreading, white except the orange-red bases, lower 5 cm, spreading, the blade about 2.5 cm broad, white, deeply divided into 2 ovate, pointed lobes, and narrowed downwards in an orange red claw; filaments red, curved, the margins inrolled over the style; anthers red. Ovary short, thick;

capsule globose; when ripe the 3 valves are reflexed, exposing their orange-red lining and numerous small seeds enclosed in a red aril.

Sahasradhara, along the slope, S. K. Malhotra 29269, 23786.

[This is var. *acuminatum*.]

Fl. & Fr. Aug.-Oct.

Distribution :—Sub-tropical Himalaya from Nepal to Kumaon.

Roscoeia procera Wall. As. Rar. 3 t 242, 1832; Baker in Hk.f. FBI. 6: 208, 1890; Collett, Fl. Sim. 509, 1902; S. K. Malhotra in Maharashtra Vidnyan Mandir, Patrika 6(1): 43, 1971.

A robust herb, stem 24-48 cm. Leaves 7.5-15 cm, lanceolate, 15×4 cm. Flowers several, lilac, faintly streaked and tinged with pink. Corolla-tube hardly longer than the calyx; upper lobe about 4 cm long, the margin inflexed, forming a narrow, flattened, pointed hood, lateral lobe, linear-lanceolate. Lower staminodes 4×3 cm, obscurely 3-lobed, spreading and notched at tip.

Sahasradhara, along rocky slopes, S. K. Malhotra 34841 (Not in BSD) and hence not seen by me.

Fl. & Fr. Aug.-Sept.

Distribution :—Western Himalaya from Kumaon, Nepal and Sikkim.

This plant is common in Mussoorie. The specimen collected from Sahasradhara must be from a much higher elevation.

ZINGIBERACEÆ

Amomum dealtabum Roxb. Fl. Ind. 1:43, 1832; Baker in Hk. f. FBI. 6: 239, 1892; Panigrahi et al in Bull. Bot. Surv. Ind. 11(1&2): 109, 1969.

Rootstock perennial, widely creeping. Stems up to 2 m. Leaves large $72-106 \times 10-15$ cm, bright green above, whitish beneath, oblong lanceolate. Spikes 5 cm across, produced direct from rootstock, globose; peduncles very short; outer bracts reddish, 2.5 cm. Calyx cylindric, 3-dentate. Corolla-tube 2.5 cm, cylindric, segments oblong, obtuse, white as long as the tube; lip obovate, cuneate, about 4 cm, white with a yellow line down the centre and radiating red veins; filaments short, arcuate; anther-crest small, subquadrate; ovary 3-celled, ovules many, superpos-

ed, style filiform. Fruit a globose capsule; reddish, 2.5 cm across with 9 winged crenulate vertical ribs.

Nishangarha, Bahraich Dist., *Panigrahi* 6480, scarce.

Fl. Nov.

Distribution :— Sikkim, Khasi hills; Silhet, Bangladesh.

Globba sessiliflora Sims in Bot. Magaz. t. 1428; Baker in Hk. f. FBI. 6:203, 1892; Schum. in Pfreich. 20:135, 1904.

An erect, perennial herb, with a creeping, short rhizome which emits fleshy root-fibres. Stems 25-60 cm tall. Leaves sessile, elliptic-oblong or lanceolate, with an acute base, acuminate-caudate, glabrous, 10-25 (-30) \times 5-6 cm; ligule oblong, obtuse, 0.4-0.5 cm long; sheaths glabrous. Inflorescence terminal, erect or decurved, paniculate, glabrous or short-hairy, with 1-3 flowered branches; bracts ovate, acute, gland-punctate, 0.3-0.4 cm long, deciduous; calyx yellow, 1-1.4 cm long, 3-lobed, lobes triangular, acute; corolla-tube slender, 1.8-2 cm long, twice as long as the calyx, lobes oblong, obtuse, 1 cm long, deflexed; lip yellow, oblanceolate-spathulate, retuse, or shallowly emarginate, 1-1.5 cm long, lateral staminodes lanceolate; stamens 2 cm long, adnate to the lip in the lower part; anther oblong, apiculate, narrowly margined, 0.5-0.6 cm long. Capsule globose; verrucose, glabrous or thinly long-hairy; seeds glabrate or hairy. Bulbils are usually present.

Dehra Dun, Bindal, C. R. Babu 32211; Robber's Cave, Raizada, C. R. Babu 33383.

Fl. July-Oct. *Fr.* Nov.-Dec.

This species is common on steep-earthwall, ravine-slopes and damp shady places in sal forest.

It is often erroneously identified and described as *G. orixensis* Roxb. and *G. racemosa* Sm. (vide Duthie FUGP 3:232, 1920; Haines, Bot. Bih. and Oris. 1:129, 1924), but is easily recognizable from the former by 1 cm long calyx, yellow-coloured lip without reddish-brown centre and the presence of bulbils, and from the latter in having glabrous leaves, longer calyx, longer corolla-tube and verrucose capsule and the presence of bulbils, whereas *G. orixensis* is characterized by 0.4 cm long calyx, yellow lip with reddish-brown centre and absence of bulbils and *G. racemosa* by hairy leaves, shorter calyx and corolla-tube, smooth capsules and absence of bulbils.

It is this species that is common in Dehra Dun. Hitherto recorded in the E. Himalaya in India and Burma.

**Zephyranthes candida* Herbert in Bot. Mag. t. 2607, 1826; Bot. Reg. 724. 1824; Bailey, Encycl. Hort. 3:3543, 1958; Backer & Bakh. f. Fl. Java 3:135, 1968.

A scapigerous, perennial herb with a subterranean, coated bulb. Leaves 12-40 cm by 2-5 mm, very thick. Flowers in long-peduncled, 1-flowered inflorescences, erect. Peduncle fistular; apical bract of peduncle 1, membranous, often bifid, with a tubular base surrounding the pedicel. Pedicel 1-15 mm long, much shorter than the bract; the later 20-24 mm long. Perianth gamophyllous, funnel-shaped 3.25-4.5 cm long; segments 8-16 mm wide, white, but the top not rarely tinged with violet. Stamens the same number as perianth-segments; anthers medifixed; style sub-equaling the stamens, with 3-apical, short obtuse lobes, not divided into linear branches; ovary 3-celled. Capsule globose, 3-lobed, loculicidally 3-valved. Seeds compressed black.

Often cultivated as an ornamental and sometimes found more or less naturalized in shady ravines and gullies near Chand Bagh, Dehra Dun, Raizada.

Fl. & Fr. July-Aug.

Distribution:—Native to Argentina, South America, but now cultivated all over the country specially in North India.

Zephyranthes citrina Baker in Bot. Mag. t. 6605, 1882; Bailey, Encycl. Hort. 3: 134, 1968; Backer & Bakh. f. Fl. Java 3:134, 1968.

Scapigerous perennial herb with about 1.2-1.5 cm across underground bulb. Leaves in a radical rosette, linear, flat, channelled, obtuse or rounded, 25-30 cm by 2.5-4 mm, somewhat fleshy. Scapes terete, glabrous, fistular, as long as or shorter than the leaves, 1-flowered; bracts spathaceous, 2 cm long, tinged purple; pedicels 0.3 cm long; perianth bright yellow with greenish base above the ovary, 3.5-4.5 cm long; tube 1-1.2 cm, segment oblong-obovate, 1-1.25 cm, wide. Stamens 6, inserted on the throat, with alternate filaments shorter, alternating with linear-subulate teeth; style much shorter than the stamens; stigma shortly 3-lobed; lobes broadly oval-ovate, 1-1.25 mm long. Ripe capsule 3-3.5 cm, 3-gonous; peduncle slightly compressed, in anthesis 15-25 cm, afterwards 30-40 cm long.

Often cultivated in gardens as an ornamental, established in waste places and has escaped from cultivation and started to run wild especially in Dalanwala, Dehra Dun and outside Botanical Garden, Forest Research Institute, New Forest, Dehra

*See Traub in Taxon 7:109-113. 1958.

Dun and several similar other localities and has become practically naturalized.

New Forest, Dehra Dun, *Raizāda* Dehra Dun Herb. No. 56657; lawn near Botanical Garden, New Forest, H.B. Naithani, 6020 A.

Distribution :—Native to British Guiana, tropical America.

Zephyranthes grandiflora Lindl. Bot. Reg. t. 902, 1825; Bailey, Man. Cult. Pl. ed. 2. 254, 1949; Backer & Bakh. f. Fl. Java 3:135, 1968. *Zephyranthes carinata* Herbert Bot. Mag. t. 2594, 1825; Bailey, Encycl. Hort. 3:3542, 1958; *Z. rosea* auct. Hort. non *Z. rosea* (Spreng.) Lindl. Bot. Mag. t. 2537, 1825; Bot. Reg. 821, 1824; Bailey Encycl. Hort. 3:3543, 1958; Backer & Bakh. f. Fl. Java 3:134, 1968; *Amaryllis rosea* Spreng. Syst. 4 Cur. Post. 133, 1827.

An erect, scapigerous, perennial herb with a 3.5-5 cm across underground bulb. Leaves in a basal rosette, linear-lanceolate, obtuse, up to 30 by 0.5-0.6 cm. Scapes fistular, ribbed, 1-flowered, up to 30-45 cm high; bracts membranous, spathaceous, purple-tinged, 4 cm long; pedicel 3.5-5 cm long much surpassing the bracts; perianth-tube 1.2-1.5 cm long, segments oblanceolate-spathulate, obtuse, 5 cm long; stamens 6, alternate filaments shorter, alternating with linear-subulate teeth, anthers linear 1.3-1.5 cm long; style linear, 5.5-6 cm long; stigma 3-fid; capsule deeply 3-lobed, 3-valved; seeds compressed, black.

Frequently cultivated as a garden ornamental and fairly well established and almost naturalized here and there in waste places, along roadsides and on grassy fields in Dehra Dun, shady ravines near Chand Bagh, Dehra Dun, *Raizāda*.

Fl. & Fr. June-July (often gregariously).

Distribution :—Commonly cultivated throughout North India and other parts of the tropics. Native country uncertain possibly Jamaica, Cuba, Mexico, Guatemala, West Indies.

In addition to the 3 species of *Zephyranthes* mentioned above *Z. tubispatha* (L' Herit.) Herbert ex Traub in Taxon 7:110, 1958 Syn. *Amaryllis tubispatha* L. Herit., Sert. Angl. 9, 1788; Backer & Bakh. f. Fl. Java 3:135, 1968, a native of Argentina & Uruguay is cultivated in India especially in Bengal and occasionally in Uttar Pradesh. It has about 5 cm long perianth, white outside, not or hardly tinged with violet, but after anthesis turning violet. For an emended and correct description of this species vide Traub in Taxon 7:110, 1958.

Zingiber roseum (Roxb.) Rosc. in Trans. Linn. Soc. 8:348, 1807; Baker in Hk. f. FBI. 6:244, 1892; Schum. in Pfreich. 20:

184, 1904; Raizada in Ind. For. Rec (n.s.) *Botany* 1(5) : 230, 1939; *Amomum roseum* Roxb. Pl. Corom. t. 126, 1800.

An erect perennial herb about 1 m high. Leaves 40-30 × 70-15 cm long, pubescent beneath. Spikes very dense, oblong; peduncle very short; bracts pale red, outer ovate, inner lanceolate up to 5 cm long. Corolla-tube whitish, 5 cm; segments pale-red 2.5 cm; lip oblong-cuneate, whitish, unspotted, basal auricles very small, yellow rounded. Stamens arching over the lip and equaling it in length, beak as long as the anther. Ovary villous; style 5-7 cm long. Fruit ovoid-ellipsoid, 3-gonous, red.

Lachiwala, Dehra Dun, *Raizada*; *R.S. Hole*; New Forest, Dehra Dun, *H.B. Naithani* 7465; Ramgarh, Dehra Dun, *B.L. Gupta*, *Raizada*; common in 'Sal' forest and shady ravines in Dehra Dun.

Fl. Aug.-Oct. Fr. Nov.-Dec.

Distribution :—Northern Circars.

Zingiber rubens Roxb. in *Asiat. Res.* 11:348, 1810; Baker in Hk. f. FBI. 6:243, 1892; Schum. in *Pfreich.* 20:148, 1904.

Dehra Dun, Bindal, *C.R. Babu* 34021; Robber's Cave, *C.R. Babu* 35299.

Common in damp shady localities, ravines slopes, forest-edges and forest-clearings.

This species is very similar to the preceding species in vegetative and floral characters, but is easily recognizable by purple-streaked or blotched lip.

A critical study of *Z. roseum* Rosc. (1807) and *Z. chrysanthum* Rosc. (1828) and *Z. rubens* Roxb. (1810) may perhaps prove that the latter two species might not be distinct enough from *Z. roseum* Rosc., as they are very closely related and differ only in the colour of bracts and lip.

Kaempferia galanga Linn., *K. rotunda* Linn. and *Languas galanga* (Linn.) Stuntz (= *Alpinia galanga* (Linn.) Sw.) may possibly be found near cultivation.

MARANTACEAE

Phrynium placentarium (Lour.) Merr. in *Philip. Journ. Sc.* 15:230, 1919 and *Trans. Am. Philosop. Soc. Philad.* n.s. 24:120, 1935; *Phyllodes placentaria* Lour. *Fl. Cochinch.* 13, 1790; *Phrynium parviflorum* Roxb. *Fl. Ind.* 1:7, 1820; Baker in Hk. f. FBI. 6:259, 1892; Schum. in *Pflanzenr.* 11(IV-48): 52, 1902; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5) : 230, 1939.

A tuberous perennial. Leaves oblong-cuspidate, 36-45 cm long, 15-20 cm broad; petiole longer than the blade, the one that bears the spike 36-48 cm long. Spikes globose from the side of the petiole, sessile, 2.5-5 cm across. Bracts pale-green 2.5 cm, lanceolate, acute, 2-3-fid. Corolla-tube as long as the bracts, segments linear-oblong, white; staminal lobes small, orbicular, white, tipped with yellow.

Adhwarsot, Haldwani division, *H. G. Champion* Dehra Dun Herb. No. 39497.

Distribution:—Himalaya & Konkan and Malaya Peninsula.

AMARYLLIDACEÆ

Pancratium verecundum Ait. Hort. Kew. 1: 412, 1789; Hk. f. in FBI. 6: 306, 1892; Raizana in Ind. For. Rec. (n.s.) *Botany* 1(5): 231, 1939.

A bulbous herb; bulb globose about 5 cm in diameter, neck cylindric. Leaves thin, 2.5-5 cm, acuminate. Scape stout 1-2 from the bulb, 15-25 cm long, 3-4-flowered, compressed; spathes lanceolate; pedicels short. Perianth-tube 7.5-10 cm, white; throat obconic, lobes about 4 cm, linear; staminal-cup obconic about 2.5 cm long, with a bifid tooth between the filaments; style longer than the stamens.

Dehra Dun cultivated. Plants raised from bulbs found wild at Lachiwala, Dehra Dun, *Raizada*.

Fl. Rainy season.

Distribution:—Forests of the Himalaya from the Punjab eastwards to Sikkim.

DIOSCOREACEÆ

Dioscorea melanophyma Prain & Burkill in Journ. As. Soc. Bengal (n.s.) 4: 452, 1908.

Tubers edible, obovoid-rotund, densely covered with roots. Bulbils 4-6 mm across, numerous, black; stem twining to the left. Leaves alternate, 5-or 7-foliate on slender shoots towards the extremities, 3-foliate or simple. Leaflets 3.5-10 × 1-2-2 cm, lanceolate with a fine acuminate tip. Male spikes 3.2 cm long, axillary pubescent, solitary or in pairs. Stamens 2 with 3 staminodes. Female spikes about 4 cm long, solitary, axillary. Capsule 1.4 cm long, oblong, more or less truncate at apex, rounded at the base. Seeds winged at the top.

Fl. & Fr. July-Nov.

Distribution:—Simla, Bashahr, Kulu, Chamba; Pakistan.

D. kumaonensis Kunth (FBI. 6: 290, 1892) is hardly distinct from this species.

LILIACEÆ

Asparagus acerosus Roxb. (Hort. Beng. 24, 1814 nom. nud.) & Fl. Ind. 2: 150, 1832; Hk.f. in FBI. 6: 317, 1892; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 232, 1939; S. L. Kapoor & L. D. Kapoor in Bull. Bot. Surv. Ind. 12(1-4): 273, 1970.

A slender scrambling or scandent or erect shrub. Roots tuberous, dirty white, usually 3 mm across; stem above the ground green, almost as thick as the under ground stock below the surface (about 3 cm). Cladodes usually 3 or at times only 2 or rarely 1 or 6 in intermediary clusters and generally 6 or rarely 3 or 8 in apical clusters, all triquetrous, those on short young branches 1.2 cm long, on older branches 5-9 cm long, spines short, recurved. Perianth segments widely spreading, white, fragrant; anthers minute, sub-globose; ovules many in each cell. Berry up to 1 cm across, 1-seeded.

Bankatwa, Bahraich, Duthie 23879; Tehri Ghat, North Chowk forest, Gorakhpur, S.L. Kapoor 70471.

Distribution:—N. Bengal, Tarai forest of Gorakhpur and Bahraich Districts; Bangladesh, Burma, N. Australia.

Asparagus curillus Buch.-Ham. ex Roxb. in Fl. Ind. 2: 152, 1832; Baker in Hk.f. FBI. 6: 318, 1892; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 232, 1939.

An excessively branched under shrub; stem tall, smooth, subscandent; branches angled, grooved; spines long, straight up to 1.5 cm long, pungent, curved. Cladodes very small 3-6 nate up to 1 cm, obtusely 3-gonous, linear, flattened or subtriquetrous, acute. Racemes corymbiform, few-flowered up to 3.2 cm long; bracts minute, lanceolate; pedicels jointed below the middle. Flowers about 1.4 cm across; perianth segments spreading, 6-partite. Ovary 3-gonous; style short, stigmas 3. Berry 3-lobed, red when ripe.

Thano, Dehra Dun, Gopi Shanker.

Distribution:—Sub-tropical Himalaya from Kumaon to Nepal.

Asparagus gracilis Royle, Ill. 1: 393, 1839; Baker in Hk.f. FBI. 6: 315, 1892; *Asparagus capitatus* Baker in Journ. Linn. Soc. Bot. 14: 607, 1875; Hk.f. in FBI. 6: 315, 1892; Raizada & Sharma in Ind. For. 88(5): 366, 1962.

A slender sub-erect under shrub; stems terete, smooth. Lower leaves often transformed into small downward directed spines about 0.4 cm long; cladodes in tufts of 2-8, needle-like or setaceous, up to 1.4 cm long. Flowers solitary in clusters of 2-8, often terminating short branchlets; pedicels jointed at or below the middle. Perianth 0.4 cm long. Stamens half as long as the perianth; anthers very minute. Berry red about 4 cm across.

Merwara above Bhim, *Duthie* 4920.

Fl. June-August.

Distribution:—Plain and dry places in the Himalaya. Apparently this species is not distinct and is the same as *A. capitatus* Baker (FBI. 6: 315, 4890).

Gagea reticulata Schult. f. Syst. 7: 542, 1827; Hk.f. in FBI. 6: 356, 1892; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 232, 1939.

A small bulbiferous herb 5-8 cm high. Leaves cauline, many, very long, filiform, recurved, 10-20 cm long. Flowers many, subumbellate, green, with a wide border. Sepals 1.5-2 cm long, acute or finely acuminate; anthers linear-oblong. Capsules as long as the perianth. Seeds flat, angular.

Banks of the Tons river, Dehra Dun, *Kirat Ram* Dehra Dun Herb. No. 77028; Nakraunda, Dehra Dun Dist. *Raizada*; Prem Nagar, beyond Iron Bridge, Dehra Dun, *Raizada*.

Fl. June.

Distribution :—The Punjab plains, ascending the Western Himalaya, Salt Range; Greece, N. Africa, Turkistan.

Lilium wallichianum Schult. f. Syst. Pl VII, 1689; Hk.f. in FBI. 6: 349, 1892; Raizada in Proc. Nat. Inst. Sci. India 24(4): 201, 1958.

Bulb small, on a creeping root-stock; scales many, short, ovate, acuminate. Stem 1.5 m, base ascending, few-flowered. Leaves 15-30 cm, narrowly linear, nerves 3-5, faint. Flowers white, subsolitary, horizontal, sweet-scented; pedicels long; perianth 15-25 cm, narrowly tubular below, then infundibular with the upper third recurved; tube greenish outside, segments subequal, oblanceolate, 5 cm broad; stamens much shorter than the perianth; anthers orange-yellow, about 2.5 cm, style recurved at the top; stigma conoidal. Capsule 3-5 cm.

Songarh, Tulsipur Range, Gonda *Sri Ram* Dehra Dun Herb. No. 118192.

Smilax aspera Linn. Sp. Pl. 1028, 1753; Hk.f. in FBI. 6:

306. 1892; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 231, 1939; Koyama in Quart. Journ. Taiw. Mus. 13:56, 1960.

A large climbing shrub; branches grooved, zig-zag, armed, or not. Leaves 5-13 cm long, 2.5-7.5 cm broad, ovate, deltoid or lanceolate, acute or acuminate, margin entire or at times with prickly teeth, base rounded, truncate or cordate, usually 7-nerved, prickly or not on the mid-rib beneath; petiole up to 2.5 cm long, often prickly, narrowly margined near the base for one-fifth of its length, the sheath ending in 2 long slender cirrhi. Umbels numerous, sessile in axillary or terminal spikes 2.5-15 cm long. Peduncle 0; pedicels small; bracteoles minute. Flowers dioecious, white, sweet-scented. Male sepals about 3 mm long, female rather smaller; anthers linear, shorter than the filaments; staminodes in female flowers 6. Berry about 0.4 cm in diameter, red at first, finally becoming blue-black when ripe.

Dehra Dun *Raizada* common on river bank and slopes of ravines.

Fl. June-Nov. *Fr.* Aug.-Dec.

Distribution.—Throughout India, from Kashmir to Khasi Hills and southwards to Travancore; Ceylon, Syria, S. Europe, N. Africa.

Smilax indica Vitm, Summa 5:422. 1879; A. DC. Monogr. Phan. 1:187, 1878; Hk. f. in FBI. 6: 310. 1892; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 231, 1939; Osmaston For. Fl. Kumaon, 539. 1927; *Smilax villandia* Wall. ex Hk. f. in FBI. 6:314, 1892; Osmaston For. Fl. Kumaon 539, 1927.

A large deciduous climber with stems about 2.5 cm in diameter, armed with recurved prickles. Leaves variable in size, 10-25 × 5-20 cm, elliptic or elliptic ovate, entire, shining, acute or shortly acuminate, base rounded usually 5-nerved, the inner lateral pair united with the midrib for a short distance above the base, reticulation thin, prominent; petiole up to 2.5 cm long, narrowly sheathing at the base, cirrhose. Umbels axillary, usually solitary, rarely 2 on a common peduncle, 20-40-flowered; common peduncle about 2 cm long, petioles up to 2 cm long, slender, lengthening in fruit. Flowers greenish, fragrant; flower buds about 1-1.4 cm long, oblong; bracteoles small, numerous. Sepals and petals recurved. Stamens 6 about as long as the petals; staminodes 3 in the female flower; stigmas 3, nearly sessile. Berry globose about 1.8 cm in diameter, red when ripe.

Dehra Dun in ravines Bindal Nala, Robber's Cave, Lachiwala etc. *Duthie* 2326; *Osmaston* 1122; *Raizada* s.n.; Garjea, Ramnagar Division *Osmaston* 1191.

Fl. July-Aug.

Distribution:—Throughout the hilly tropical districts of India, from Kumaon eastwards to Assam & Bengal, Concan to Ceylon, Burma, Java, Malaya Peninsula.

This species is occasionally confused with *S. macrophylla* Roxb. which is fairly common in the 'Sal' Forests of Dehra Dun and Saharanpur Divisions, but can be distinguished from it in that in *S. indica* the umbels are usually 1, rarely 2 and the pedicels are up to 1.2 cm long while in *S. macrophylla* the umbels are usually 2-3, rarely 1 and the pedicels are half as long as in *S. indica*.

Smilax luzonensis Presl. Rel. Haenk. 1:131, 1827; Merr. in Philip. Journ. Sci. 10:295, 1915 et Enum. Philip. Flow. Pl. 1:209, 1922; Koyama in Quart. Journ. Taiw. Mus. 13:29, 1960; *S. helferi* DC. Monogr. Phan. 1:176, 1878; Hk. f. in FBI. 6:309, 1892.

A slender climber. Stems terete, usually prickly with short recurved prickles or branchlets inermous. Leaves ovate-lanceolate-oblong, with an acute or rounded base, cuspidate-acuminate, thinly coriaceous, with 3 main nerves which are free to the base; male flowers: peduncles 1.5-2 cm long, ebracteate or with a bract inserted below the middle; bracteoles minute, ovate, acute; pedicels many, 0.3-0.5 cm long; buds 0.5-0.7 cm long; tepals greenish-white, oblong-obtuse; stamens 6, as long as the tepals; pistillode absent. Fruit globose.

Dehra Dun in ravines, *Raizada*; Bindal, Dehra Dun, C.R. Babu 33240.

Fl. July-Sept. *Fr.* March-June.

This species is common in ravine slopes.

It is very closely allied to *S. lanceaefolia* var. *opaca* DC. (= *S. laevis* Wall. ex DC.), a taxon that does not occur in India (vide, Koyama, loc. cit. 22-27), but is easily recognizable by elliptic leaves with acute ends and faint nerves, whereas *S. lanceaefolia* var. *opaca* is characterized by ovate-lanceolate leaves and prominent nerves.

PONTIDERIACEÆ

Eichornia crassipes (Mart.) Solms in DC. Monogr. Phan. 4:527, 1883; *Raizada* in Ind. For. Rec. (n.s.) Botany 1(5): 232, 1939; Backer in Fl. Males 1, 4:259, f. 2-3, 1951; Fischer in Fl. Pres. Madras, 1530, 1928; Subramanyam Aq. Angiosp. 70, f. 48, 1962; *Pontederia crassipes* Mart. Nov. Gen. Sp. 9, t. 4, 1823; *Eichornia speciosa* Kunth Enum. 5:61, 1843; Biswas & Calder, Hand-book of Common Water & Marsh Plants of India and Burma 82, 1955.

Floating aquatic herbs, often rooting in clump, slender, terete, glabrous, pink often white and fleshy when young; stolons axillary, stout, spongy semicylindric. Leaves radical, rosulate, 2-20 cm in diameter, ovate to broadly ovate, or rhomboid, erect or oblique, smooth, shining, obtuse at apex, truncate or cuneate to shallowly cordate at base, curvinerved, sheath up to 10 cm long, membranous, striated above, swollen about the middle. Spikes 8-30, flowered; peduncles up to 20 cm long, angular, compressed at places, smooth, shining; bracts 2; lower: foliaceous, with a tubular sheath; upper tubular; completely enclosed, apiculate. Flowers 2-4 cm long, lilac or pale-violet, funnel-shaped, trimorphic, heterostylous, slightly irregular. Perianth lobes 6, upper 3 larger than the lower 3, each 1.5-1.8 cm long, ovate and ovate-oblong. Stamens 6, unequal, inserted on throat of perianth-tube, curved, exserted; filaments slender, tubular, those of larger stamens clothed with glandular hairs, those of smaller stamens glabrous; anthers versatile, violet. Ovary superior, 3-celled, with many ovules in each cell, on axile placenta. Styles 3, connate, curved, hairy or glabrous; stigmas fringed. Fruit an oblong capsule, breaking open in the middle of each cell-wall. Seeds minute, oblong or ovoid, many ribbed, but often do not set.

Distribution :—The 'Water-hyacinth' is a native of Brazil; because of its beautiful flowers it was introduced into the Old World by about 1829, into Java by about 1886. It was introduced in India towards the end of the 19th century (Santapau in Ind. Farming 14:20-23 and 25, 1964) and has now become a serious pest very difficult to eradicate in Burma, Bengal and Orissa. It has already spread as far westwards as Lahore and has been reported from Bangalore, Bombay, Assam, Andhra Pradesh, Madras and Kerala. It has spread to many parts of India during the last 70 years or so. It is however, still not a very serious pest in U.P. although it is common all over in ditches and ponds.

It is widely distributed now in nearly all South and Central America, Australia, China, Japan, India, Thailand, Indo-China, S. Africa, Congo and other parts of Africa.

Fl. Rainy season and practically throughout the year.

COMMELINACEÆ

Commelina tuberosa Linn. Sp. Pl. 41, 1753; Bailey, Stand. Cyclop. Hort. 1:836, 1958 (17th Printing); *Commelina coelestis* Willd. Enum. Hort. Berol 69, 1806.

An erect herb, 25-46 cm high, roots more or less tuberous, branches with clasping, long broad-lanceolate, pointed leaves 7.5-15 cm long, minutely scabrous or glabrous.

Spathes pubescent, rounded or cordate at base, with wavy margins; spathe leaves ovate, folded, sheaths ciliate; upper racemes 4-10-flowered, lower 1-2-flowered, hairy, two inner sepals slightly connate; petals deep blue, about 1.5 cm long.

Above Sahasradhara, Raizada.

Fl. & Fr. Rainy season.

Distribution:—A native of Mexico now run wild in Mussoorie and descends up to 800 m.

The two species *Commelina tuberosa* Linn. and *C. coelestis* Willd. are hardly distinct and apparently synonymous.

Commelina forskalaei Vahl, Enum. 2: 172, 1806; Hk.f. in F.B.I. 6: 371, 1892.

A diffuse branched creeping or straggling herb with aerial chasmogamous and underground cleistogamous flowers, rooting at the nodes. Leaves linear or narrowly oblong, often undulate. Aerial spathes axillary, 3-5-flowered; flowers sky-blue. Capsules usually 3-seeded. Seeds smooth, subglobose. Cleistogamous flowers usually solitary in a spathe, bisexual reduced. Capsules usually 1-seeded.

Delhi, common on the Ridge; Najafgarh village, J. K. Maheshwari 432 & 19050.

Fl. & Fr. Aug.-Nov.

Distribution:—Deccan Peninsula in the Konkan; tropical Africa.

This species is easily distinguished from *C. benghalensis* L. by its linear leaves and smooth seeds.

Commelina suffruticosa Blume, Enum. 3, 1830; Hk.f. in F.B.I. 6: 374, 1892.

Stem branched, stout, rarely glabrous. Leaves large, sessile, lanceolate, scabridly pubescent, 7.5-36 × 2-5 cm, acuminate; sheaths auricled. Spathes very shortly peduncled, broadly ovate, acute, cucullate, longer than their peduncle, paniced or clustered, acute or obtuse, villous, up to 1.5 cm long and broad. Racemes simple, 6-12-flowered. Petals white or blue. Seeds ellipsoid, rugose, straw-coloured.

Mothronwala, Dehra Dun Distt. Raizada s.n., K. M. M. Dakshini 8056 & 16392.

Fl. Rainy season.

Distribution:—Tropical India from Nepal, Sikkim and Bengal to Central India and the Malaya Peninsula.

Commelina undulata R. Br. Prodr. 270, 1810; Clarke in DC. Monogr. Phan. 3: 179, 1881 (excl. var. *setosa*); Rolla Rao in Notes Roy. Bot. Gard. Edin. 36: 352, 1966 and Blumea 14: 351, 1966; *C. kurzii* Clarke in Journ. Linn. Soc. Bot. 11: 144, 1870; Hk.f. in FBI. 6: 373, 1892; Rolla Rao & Kamathy in Journ. Bom. Nat. Hist. Soc. 59: 61, t. 1, A & D, 1962; Panigrahi & Kamathy in Journ. Ind. Bot. Soc. 43: 304, f. 10, 1964.

A perennial much branched, trailing, ascending or decumbent herb, with 30-70 cm long, bracts; stems slender and thick, terete, glabrous. Leaves 4.7-12.5 × 1.6-5 cm, lanceolate, entire along margins, minutely hirsutulous and dark green above, glabrous and greyish green or somewhat stramineous below, acuminate at apex, rounded or suddenly contracted at base, sheaths 1-2.5 cm long, loose, striate, minutely hirtellous, ciliolate along margins at mouth. Spathes 2-5, terminal, accompanied by 2-4 smaller leaves, each 1.7-2.5 cm in diameter, funnel-shaped, beaked on the anterior side; peduncles 3-5 mm long, covered by leaf-sheaths. Flowers in bifid cymes; inner clusters represented by stumps, outer 3-6 flowered. Sepals 3, membranous. Petals 3, violet or purplish violet, equal or subequal, clawed. Capsules 2-3 in each spathe, each 5-6 cm long, oblong, 3-celled, 3-valved, each cell with free seed. Seeds about 5 mm long, oval, greyish-black with a white membranous margin.

Delhi, Roshanara Gardens, J. K. Maheshwari 298; also occurs in the hilly plateaus, spreading upon rocks and growing in crevices of stones. Sahasradhara, Raizada; Chitrakut, Banda dist. M. A. Rau 3854; Mirzapur, M. A. Rau 6151.

Fl. Nov.-Dec. and May-Feb. Fr. May-July.

According to Rolla Rao et. al. (l.c.) this is a highly polymorphic species and has been often confused with *C. paludosa* Bl. (= *C. obliqua* Buch.-Ham.). They can, however, be easily distinguished in that in the former (*C. paludosa*) the flowers are blue; spathes unaccompanied by smaller leaves; seeds with creamy white covering; while in *C. undulata* the flowers are violet; spathes accompanied by 2-4 smaller leaves in addition to 2 longer leaves; seeds with membranous margin.

Cyanotis arachnoidea Clarke Monogr. 250, 1881; Hk.f. in FBI. 6: 386, 1892.

Suberect, cottony or cobwebby herb; leaves very variable, linear-oblong or lanceolate, rather obtuse; cymes subsessile, terminal and axillary; bracteoles falcately lanceolate; filaments bearded; style bearded and thickened below the tip; capsules oblong; seeds elongate, conical, obscurely pitted.

This species has been included on the authority of M.A. Rau (Bull. Bot. Surv. India 10 (Suppl. 2) 81, 1968-1969. I have not seen any specimens of this species from the area in the Dehra Dun Herbarium or else where.

Distribution.—The Deccan Peninsula, Nilgiri hills; Ceylon.

Cyanotis cucullata (Roth) Kunth, Enum. 4: 107, 1843; Hk.f. in FBI. 6: 389, 1892; Raizada & Sharma in Ind. For. 88 (5): 367, 1962; *Amischocephalus cucullata* (Roth) Rolla Rao & Kammathy in Journ. Linn. Soc. 59: 306, 1966; *Tradescantia cucullata* Roth Nov. Pl. Sp. 189, 1821; *Zygomenes cucullata* (Roth) Rolla Rao & Kammathy in Notes Roy. Bot. Gard. Edinb. 25: 187, 1964.

A decumbent or suberect annual with 15-40 cm long, glabrous, stout branches, usually from the basal regions; branches rooting at lower nodes. Leaves sessile, 2.5-6 × .5-1 cm, narrowly linear or linear lanceolate, succulent, distichous, recurved; sheaths more or less globosely-inflated. Flowers generally 1-2 in all axils, almost included in the sheath pouch. Corolla violet-blue. Stamens with filaments densely bearded with long beaded blue hairs; anthers yellow. Style blue with colourless 2-lipped stigma. Fruit a trigonous capsule, 3-horned at the top with a central depression, included or slightly protruding from the sheath pouch.

Nasirabad-Kekri Road, Ajmer District, V.S. Sharma 1238. The species is rare and occurs in marshy fields. The entire plant ultimately turns reddish-brown.

Fl. & Fr. Oct.-Nov.

Distribution.—The Deccan Peninsula, Kanara.

Rao (Notes Roy. Bot. Gard. Edinb. 25: 184, 1964) segregated from *cyanotis* D. Don (1825) nom. cons. into a distinct genus by its axillary sessile inflorescence, linear, transparent, small bracteoles and capsule with pointed or depressed apex and chromosome number being 2n: 20, and adopted the name *Zygomenes* Salisb. (1812). A little later, Rao & Kammathy (Journ. Linn. Soc. 59:306, 1966) proposed the generic name *Amischocephalus* for *Zygomenes* Salisb. (Trans. Hort. Soc. Lond. 1:271. 1912 nom. nud.) ex Hassk. (Schweinfurth, Beit. Fl. Aethio. 211-214, 1867) which according to them was an illegitimate name by being a nomenclatural synonym of *Cyanotis* D. Don. (1825) nom. cons.

However, Brenan (Journ. Linn. Soc. 59:362, 1966) in his latest classification of the family *Commelinaceae*, has not adopted this genus, and treated it under *Cyanotis* D. Don. Hook. f. (l.c.) & Fischer (in Gamble Fl. Madras 3:1549, 1931) have erroneously described the filaments as 'glabrous' in this species while distinguishing it from *C. axillaris* R. & S. This has commonly led to the misidentification of the present species as *C. axillaris*. It

can, however, be easily distinguished from *C. axillaris* by its capsules which are 3-horned at the top; having a central depression, where as in the latter species the capsule are simply beaked. Further more even in dry specimens it can be seen that *C. cuculata* has comparatively much swollen leaf-sheaths than in *C. axillaris*.

Cyanotis fasciculata (Heyne ex Roth) Schult. f. Syst. 7:1152, 1830; Clarke Monogr. 253, 1881; Hk. f. in FBI. 6:387, 1892; Raizada & Sharma in Ind. For. 88(5): 369, 1962; *Tradescantia fasciculata* Heyne in Roth Nov. Sp. 189, 1821.

An erect or decumbent, purplish succulent annual 10-20 cm high, rarely more; floccosely hairy all over and soon turning purple-blue. Leaves 2.5 cm long, generally linear-lanceolate, sessile. Flowers purplish in axillary and terminal cymes. Sepals light green; petals pink or purple, projecting above the calyx. Anthers yellow; filaments bearded with violet or bluish hairs. Capsule trigonous. pilose at the apical region; seeds oblong, fairly rugose.

Ajmer, Taragarh Mountain, V.S. Sharma 550; Nagpahar Mt. V.S. Sharma 975; Mirzapur in dry shady sandstone rocks mostly on northern face, *Bhattacharyya* 17628; Mahoba, Hamirpur Dist., U.C. *Bhattacharyya* 17775; Band Baretta, Dist. Agra, K.C. Basu Chowdhury s.n.

Fl. & Fr. Aug.-Sept.

Distribution :—Central Provinces, Deccan Peninsula, common in rocky places from Konkan southwards; Ceylon.

This species is seen to form gregarious patches over the rocks as well as on gravelly ground. It is very common in rock crevices and in moist situations throughout the hills.

PALMÆ (ARECACEÆ)

Caryota urens Linn. Sp. Pl. 1189, 1753; Beccari & Hk. f. in FBI. 6:422, 1890; Blatter, Palms of Br. Ind. & Ceylon 339, t. 57, f. 48, 1926; Santapau in Rec. Bot. Surv. Ind. 16(1): 327, 1953.

A tall feather-leaved palm. Trunk greyish-black, with regular transverse bands. Leaves bipinnate, the primary divisions arched and drooping. Leaflets fasciculate or alternate, cuneiform, obliquely truncate, fish-tail-like. Spadix very large, 2.5-3.5 m long. Peduncle curved, covered over with large, coriaceous spathe; branches very long, pendulous, resembling a huge horse-tail. Male buds narrowly cylindric. Fruit dark purple, pericarp thin.

Planted in gardens all over the Upper Gangetic Plain.

Fl. Most part of the year. *Fr.* July.

Distribution :—Throughout the hotter parts of India from Sikkim Himalaya and Assam, southwards to Ceylon and Singapore; Tropical Asia, Malaya.

Roystonea regia (H.B.K.) O.F. Cook in Bull. Torrey Bot. Cl. 513, 1901; Bailey, Man. Cult. Pl. 173, 1949; *Oreodoxa regia* H.B.K. Nov. Gen. & Sp. 1:305, 1815; Blatter, Palms of Br. Ind. & Ceylon 396, t. 73, 1926.

A tall unarmed, annulate, graceful palm, 12 m or more tall, with a columnar, single bole. Trunks smooth, covered all over with a whitish surface, generally more or less thickened at the middle. Leaves very large, terminal, pinnate; leaf sheaths elongate. Leaflets firmly papyraceous, ensiform, many-nerved lengthwise; apex shortly bifid.

The 'Bottle palm' is commonly planted in public gardens and parks along the roads, where it forms a magnificent avenue by its striking appearance.

ARACEÆ

Acorus calamus Linn. Sp. Pl. 324, 1753; Hk. f. in FBI. 6:555, 1893; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5) : 233, 1939.

A perennial marsh herb with aromatic rhizome, resembling *Typha* in habit. Leaves ensiform, 90-180 cm long, 10-20 cm broad with wavy margins. Leaves parallel. Peduncle leaf-like; spathe the ensiform continuation of the peduncle. Spadix sessile, cylindric, dense-flowered, flowering upwards, 5-8 cm long. Flowers bisexual. Sepals 6, orbicular, concave, tips incurved. Stamens 6, filament linear, flat; anthers reniform, cells confluent above, slits extrose. Ovary conical, 2-3 celled; stigma minute; ovules many, pedulous from the top of each cell, orthotropous. Fruit a few-seeded berry. Seeds oblong.

Saharanpur, *Jameson*; Tulsipur range, Gonda Division, *Sri Ram* 2102; Mothronwala, Dehra Dun, *B.L. Gupta, Raizada*.

Fl. & Fr. Nov.-Feb.

Distribution :—Throughout India and Ceylon in marshes, ascending the Himalaya to 1800 m in Sikkim, north temperate and warm regions.

Pothos cathartii Schott. Aroid. 1:22, t. 44, 45, 1853; Hk. f. in FBI. 6:552, 1893; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5) : 233, 1939; Osmaston For. Fl. Kumaon 549, 1927.

An evergreen climber attaining a great height. Leaves alternate, 7.5-17 cm long, 3-5 cm broad, oblong or ovate-oblong, acuminate; nerves indistinct. Petiole 2-10 cm long, winged on each side to form a leaf-like expansion, 1-2.5 cm broad at the broadest part. Peduncle very stout, solitary, axillary, 1.2-2.2 cm long below the spathe partly hidden by 4 or 5 imbricating bracts. Spathe suborbicular, cordate, cuspidate, green usually tinged with purple. Stipe about 1 cm long, terminating in an ellipsoid, yellow, fleshy, many-flowered spadix, 1-1.5 cm long. Ovary 1-celled, with 1-basal ovule. Berries scarlet, 1.8-2 cm long.

Sultan, Ramnagar Division, *P. C. Kanjilal*; Kalgarh Rau, Kalagarh Div., *A.E. Osmaston* 1300.

Fl. March-April.

Distribution.—Tropical Himalaya, from Kumaon to Bhutan, Assam, Khasi Hills, Burma.

Raphidophora glauca (Wall.) Schott in Bonpland. 5:45, 1857; Hk. f. in FBI. 6:547, 1873; Raizada Ind. For. Rec. (n.s.) *Botany* 1(5) : 233, 1939; Osmaston For. Fl. Kumaon, 550, 1927; Som Deva in Bull. Bot. Surv. India 10(2):181, 1968; P.C. Kanjilal For. Fl. Plains Uttar Pradesh 704, 1966; *Pothos glauca* Wall. Pl. As. Rar. 2:45 t. 156, 1831.

A large, evergreen climber up to 15 m high with the habit and appearance of *Scindapsus officinalis*. Leaves 15-30 cm long, 8-22 cm broad, obliquely ovate, pinnati-partite with 1-2 deep cuts on either side of the midrib or less frequently quite entire. Petiole 10-30 cm long, deeply grooved. Peduncle solitary, sub-terminal, 5-10 cm long. Spathe 6-8.5 cm, fleshy. Spadix sessile, cylindric, pale-yellowish, 5-7 cm long. Flowers bisexual; stamens 4-6; ovary imperfectly 2 celled; ovules many. Berries confluent. Fruiting spadix erect.

Gauriphanta forests, North Kheri Division, *Sri Ram*; Mundiapani, Kalagarh Division, *A.E. Osmaston* 1299; Robber's Cave, *Raizada, Som Deva* 2580.

Fl. Aug.-Sept.

Distribution.—Tropical and sub-tropical Himalaya from Nepal eastwards to Khasi Hills, Nagaland, Manipur hills.

Remusatia hookeriana Schott. in Oestr. Bot. Wochenbl. 8:133, 1858; Hk. f. in FBI. 6:522, 1893; Som Deva in Bull. Bot. Surv. India 10(2) : 181, 1968.

Root stock tuberous, emitting long slender branches bearing small bulbils covered with fibres; stems 5-7.5 cm, erect, slender. Leaf radical, solitary, peltate, entire, ovate-oblong, about 12 ×

5.5 cm, cordate, long pointed, the upper surface glabrous, often variegated with pale and dark green, lower surface, pubescent on the nerves; stalk about 10 cm. Spathe up to 5 cm, tube ovoid, green, margins overlapping; limb erect, yellow, ovate-lanceolate, pointed, the margins overlapping near the top and often twisted, but open below exposing the top of the spadix. Spadix not prolonged. Flowers fragrant, male and female on the same plant; female on the lower part of the short spadix, male on the top, a few narrow, scale-like neutral organs separating them; ovary ovoid, 1-celled; ovules many, inserted on the walls of the ovary. Berries small, on a head enclosed in the persistent spathe-tube.

Near Rajpur, *Raizada*; below Rajpur, *Som Deva* 2578, 2672.

Fl. & Fr. Rainy season.

Distribution.—Temperate Himalaya, Simla to Sikkim.

LEMNACEAE

Lemna minor Linn. Sp.Pl. 976, 1752, Hk. f. in FBI. 6:556, 1893; Vyas in Journ. Bom. Nat. Hist. Soc. 64 (2) : 225, 1967.

A small floating annual; root solitary, root-sheath not appendaged. Cap obtuse; frond up to 0.25 cm long, symmetrical, ovoid or oblong, nearly flat on both surfaces, young sessile on the old, but soon detached. Flowers in marginal clefts of fronds. Spathe 2-lipped. Stamens 2 (each a male flower), filaments slender; anthers 2-celled. Style long, ovules solitary. Seed horizontal, hemi-anatropal, albuminous.

Dakrani, Wetern Dun, *Gollan*; Alwar, *L.N. Vyas* 671 A.

Distribution.—Western Tibet, throughout India, Cosmopolitan.

Lemna trisulca Linn. Sp. Pl. 970, 1753; Hk. f. in FBI. 6:557, 1893.

A small floating annual; root solitary, root-cap acute, fronds oblanceolate, tip serrate, young hastate, persistent. Flowers 1-3, naked or in a spathe; perianth 0. Stamens 1-2, anther 1-or 2-celled; ovary 1 celled, style very short, ovule solitary. Seeds hemianatropous, horizontal; testa rough, grooved.

Mahoba, Hamirpur Dist., *U.C. Bhattacharya* 21014.

Fl. March-April.

Distribution.—Punjab, Bengal, the Konkan, Manipur; Burma; Temperate and tropical regions.

ALISMATACEÆ

ALISMATACEÆ

Limnophyton obtusifolium (L.) Miq. Ind. Bat. 3:242, 1855; Hk. f. in FBI. 6:560, 1893; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5) : 234, 1939; Hartog in Fl. Males. 1, 5:324, f. 4, 1957; Subramanyam AQ. Ang. 86, 1962; *Sagittaria obtusifolia* Linn. Sp. Pl. 993, 1753.

A robust aquatic herb with pellucid-punctate, broadly sagittate leaves tapering to a fine point at apex, with long basal lobes 15-30 × 10-20 cm. Petiole striated, channelled above, 36-108 cm. Panicle with a stout branching scape 0.7-1.5 m long. Flowers arranged in whorls on the branches of panicle. The upper whorls mostly male, the lower bisexual. Flowers white; stamens 6. Achenes wrinkled, numerous, obovoid, collected into a globose head.

Bharatpur, Raizada; New Mohanlal Ganj, Lucknow, Patil 1282; Ajmer A.E. Laurie 4401; Dalbehat, Bundelkhand Duthie 7046; Hutchinson 7045; Lakaoti, Bulandshar Dist. Netar Pal Singh; Mahoba, Hamirpur Bhattacharya; Parkhan, Muttra, Bharadwaja; Mansarovar Tal, Jhansi, T.A. Rao.

Fl. & Fr. Sept.-Oct.

Distribution:—The Deccan from Konkan southwards, in tanks. Ceylon, Tropical Africa, Madagascar.

BUTOMACEÆ

Butomus umbellatus Linn. Sp. Pl. 372, 1753; Hk.f. in FBI. 6: 562, 1893; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5): 234. 1939.

An erect glabrous aquatic herb with a stout creeping rootstock. Leaves erect, linear, elongate, triquetrous, 1-1.5 m long. Scape erect, terete. Flowers in umbels, pink, bisexual; bracts 3. Sepals and petals both coloured and persistent, coriaceous, erect. Stamens 9, hypogynous. Carpels 6, whorled, on a flat receptacle, connate below; ovules many, scattered, parietal, ascending. Fruit of 6 coriaceous beaked many-seeded follicles. Seeds linear-oblong, furrowed.

Marshy places near Gomti, Lucknow, Raizada.

Fl. Feb.-March.

Distribution:—The Punjab and Kashmir in marshes; Europe, North Asia.

APONOGETONACEÆ

Aponogeton natans (Linn.) Engl. & Krause in Engl. Planzenr. 24: 22, 1906; Subramanyam in AQ. Ang. 92, 1962;

Saururus natans L. Mant. 2: 227, 1767; *Apognogeton monostachyon* L. f. Suppl. 214. 1781; Hk.f. in FBI. 6: 564, 1893.

An aquatic herb with edible stoloniferous root stock. Leaves floating, oblong, to linear-oblong, $7-15 \times 1.8-3$ cm, 3-5-nerved, opaque, cross nervules distinct. Spikes solitary, sepals 2, shorter than the 3 smooth, 4-8-seeded folicles. Flowers white, pink or pale-blue with bluish purple anthers. Seeds ribbed.

Shahadra, near Delhi, *P. P. Khanna* 1108; Hastnapur, Meerut Dist. *Raizada*.

Fl. & Fr. Throughout the year and mainly after the rains.

Distribution:—Throughout India in tanks; Ceylon, Trop. Asia & Australia.

ZANICHELLIACEÆ

Zanichellia palustris Linn. Sp. Pl. 269, 1753; subsp. *pedicellata* Wahlenberg & Rosen; Hk. f. in FBI. 6: 568, 1893; Panigrahi et al. in Bull. Bot. Surv. Ind. 9(1-4): 260, 1967.

A submerged salt-water plant with slender root-stock and stem. Leaves linear, sheath stipular. Flowers minute, enclosed in leaf-sheaths, a male and female in one membranous spathe. Male peduncle short, male flower a linear 2-3 celled anther, filament slender. Female flower perianth cupular, hyaline. Carpels 2-9, sessile; style long, slender, stigma oblique, peltate, crenate; ovule solitary, pendulous, orthotropous; achenes 2-4, subsessile or stipitate, back crenate or tubercled; seeds pendulous, terete, thin.

Banki, Bahraich Dist., *Panigrahi* 10562, in dirty stagnant water pond.

Distribution :—Salt marshes and lagoons throughout India.

ERIOCULACEÆ

Eriocaulon edwardii Fyson in Journ. Ind. Bot. Soc. 2: 313, 1921; Haines, Bot. Bihar & Orissa 3: 1119, 1961 (Repr. ed.).

An aquatic or marshy herb. Leaves 2-5 cm long, 5-6 mm broad at the base, acute, glabrous, slender; peduncle 6-20 cm, slender. Heads 3-5 mm, obconic but finally globose, involucre bracts not reflexed, 4 mm long, scarious, glabrous, elliptic, acute, a little longer than the floral bracts; these glabrous, obovate, acute, grey. Receptacle tall, villous. Female flowers: sepals 2, slender; petals often filiform, sometimes linear, 2 or 0.

Male flower: sepals 2, lanceolate to linear lanceolate, connate into a spathe, petals 0; anthers 6, black. Heads globose or nearly so, in bud over topped by the acute involucre bracts.

Robber's Cave, Dehra Dun *Raizada*; C. R. Babu 3404 a & b.

Distribution:—Sikkim, Bengal, Bihar, Chota Nagpur.

Eriocaulon setaceum Linn. Sp. Pl. 87, 1753; Hook.f. in FBI. 6: 572, 1893; Haines, Bot. Bih. & Or. 1064, 1924; Gamble, Fl. Pres. Madr. 3: 1126, 1957 (Repr. ed.); Bhattacharya in Bull. Bot. Surv. Ind. 5(1): 62, 1963.

Free floating, submerged aquatic annual. Stem flexuous 10-100 cm long, tubular, 0.5-0.8 cm in diam. spongy, ending in tufted thread like roots. Leaves acicular, 8-15 cm long, numerous, horizontal to the stem, submerged, uninerved; scapes terminal, projecting above water, dark bluish green radiating at an angle, inner shorter than outer, 6-12 cm long, swollen towards the base by enclosed sheath, mouth of the sheath scariously toothed, membranous. Spikes hemispherical, small nearly flat on the top, grey to nearly black, 0.3-0.5 cm in diam. Receptacle villous, involucre bracts very small, glabrous. Male sepals usually united into a split spathe; corolla tube with 3 minute petals. Stamens 6 with black anthers. Female sepals obovate, hairy on the back. Petals 3, narrow, ciliate. Seeds oblong, smooth, dark brown.

Mirzapur by the side of Bindam falls, in a water pool on the shady hill slopes, *Bhattacharya* 17763. The plants were entangled with *Spirogyra* and other associates were species of *Blyxa*, *Microcarpaea*, *Limnophila* etc. Rare.

Fl. Sept.-Oct.

Distribution:—Orissa, Mysore, West Coast, Ceylon.

CYPERACEAE

Bulbostylis densa (Wall. ex Roxb.) Hand.-Mazz. in Karsten & Schenk. Vegetationsb. 20, 7: 16, 1930; Hara, Journ. Jap. Bot. 18: 467, 1942; Kern in Reinwardtia 6(1): 51, 1961, in Back. & Bakh. Fl. Java 3: 468, 1968 et in Fl. Males. (Ser. 1) 7(3): 538, 1974; f. Som Deva & Naithani in Ind. For. 100(10): 637, 1974; *Scirpus densa* Wall. in Roxb. Fl. Ind. 1: 231, 1820; *Isolepis trifida* Nees in Wight, Contr. Bot. Ind. 108, 1834; *Bulbostylis capillaris* var. *trifida* Clarke in Hk. f. FBI. 6: 652, 1893; Srivastava in Journ. Bom. Nat. Hist. Soc. 53: 152, 1955; *Bulbostylis trifida* Nelves, Kew Bull. 1950: 209, 1950.

A perennial or annual (?) herb. Stems setaceous, glabrous and smooth (1-) 5-40 cm by 1/4-1/3 mm. Leaves much shorter than the stems, capillary, glabrous, slightly scaberulous at the top, 1/4-1/3 mm wide. Inflorescence very variable, simple or subcompound, with 1-many spikelets, in male usually very loose, up to 5 cm long. Involucral bracts usually very short, glume-like, or the lower 1-2 setaceous with dilated scarious base, sometimes up to 7 cm. Spikelets solitary, oblong, ovate to oblong, acute, rather densely flowered, 3-6 by 1 3/4-2 mm, muticous, strongly keeled, with nerveless sides and ciliolate margins, brownish to castaneous, 1 3/4-2 mm long. Stamens 2; anthers oblong; style 3/4-1 mm; stigmas 3, shorter than the style. Nut triquetrous, obovate to broadly obovate, densely granular-puncticulate, stramineous to fumose, 0.7-0.9 by 0.5-0.8 mm; epidermal cells minute, isodiametric to oblong.

Sahasradhara, Raizada, Som Deva 6171, in dry sand along the river.

Fl. & Fr. July-Oct.

Distribution :—Widely distributed in the Old World tropics and subtropics; S. & E. Asia to China and Japan, tropical Africa and Australia.

Bulbostylis densa is very near to the American *B. capillaris* (L.) Clarke, differing by the more acute, glabrous or only slightly pubescent glumes, and the granular, not or hardly transversely rugulose nuts.

Carex brunnea Thunb. Fl. Japon. 38, 1784; Clarke in Hk. f. FBI. 6:705, 1894; Nemes in Reinwardtia 1(3): 357, 1951; Back. & Bakh. f. Fl. Java 3:493, 1968; Som Deva & Naithani in Ind. For. 100(10): 637, 1974.

A perennial with slender, obtusely trigonous stems up to 1 m high. Leaves nearly as long as the stem, 2-4 mm wide. Inflorescence loose to rather dense, (2-) 4-8 fascicles of 2-5 spikelets all single at the nodes, lower fascicles rather distant, upper approximate; spikelets erect or suberect, red-brown, cylindric or narrowly cylindric, rather dense to loose, androgynous, 1-4.5 cm by 2-4 mm, lower often branched near the base, on long-exserted peduncles. Glumes containing female flowers ovate or ovate-lanceolate, 2-4 mm long. Utricles tapering to a distinct, 0.5-1 mm long stipe, ovate to oblong-elliptic, plano-convex, prominently multinerved, whitish, setulose at least on the margins, with 1-2 mm long, bidentate beak, 2.5-6 mm by 1-1.5 mm; nut ovate or oblong-ovate, 1.5-2.25 mm long, flattened.

Rispana bed, Rajpur, under trees in humus, Raizada; Rispana, near Rajpur, Som Deva 2954, in rich humus under the shade of trees.

Fl. & Fr. Oct.-Nov.

Distribution :—Hilly Districts throughout India, 1000-3000 m; Madagascar, Australia, Japan, Malasia.

Carex filicina Nees is Wight, *Contrib. Bot. Ind.* 123, 1834; Clarke in *Hk. f. FBI.* 6:717, 1894; Nelmes in *Reinwardtia* 1(3) : 304, 1951; Back. & Bakh. *f. Fl. Java* 3:492, 1968; Som Deva & Naithani in *Ind. For.* 100(10) : 638, 1974.

A perennial with very woody short rhizome. Stems up to 1 m. Leaves often as long as stems, flat, up to 1.3 cm broad. Spikes 50-200, linear up to 2.5 cm, lengthening in fruit, not crowded, red-brown, male at top, the lower utricles distant, forming an oblong panicle usually more than half the length of the plant. Glumes containing female flowers ovate, acute. Utricle glabrous, narrowly lanceolate, more or less 3-sided; nerves few, distinct; beak straight, shortly bifid. Style 3-branched. Nuts 3-sided, 1-2 mm long.

Mohand Siwaliks, *H.B. Naithani* 3911, on landslips in Siwalik.

Fl. & Fr. Sept.-Oct.

Distribution :—Temperate Himalaya, 1000-3000 m, from Kumaon to Bhutan.

Carex spiculata Boott in *Proc. Linn. Soc.* 1: 288, 1845; Clarke in *Hk. f. FBI.* 6:724, 1894; Raizada in *Ind. For.* 71(11) : 497, 1950; Som Deva & Naithani in *Ind. For.* 100(10) : 638, 1974.

A robust perennial, stem up to 1 m. Leaves narrow often as long as the stem. Panicle rigid, lax, up to 1 m, branches scabrous. Spikes 7 cm by 0.4 cm, many male 4 cm, pale or rarely deep brown, denser with obliquely ascending fruits. Utricle ellipsoid, trigonous, lanceolate upwards; beak as though short cylindric, the strong margins of the utricles carried up the beak as winged margins.

Karuapani, Dehra Dun Division, *Raizada* Dehra Dun Herb. No. 89791. Rarely occurs as an undergrowth in Swamp Forests.

Fl. & Fr. Oct.-Nov.

Distribution :—Sikkim, Khasi hills.

Carex stramentitia Boott ex Boeck. in *Linnaea* 40:351, 1876; Clarke in *Hk. f. FBI.* 6:717, 1894; Nelmes in *Reinwardtia* 1(3) : 267, 1951; Backer. & Bakh. *f. Fl. Java* 3:492, 1968; Singh & Dixit in *Ind. For.* 98(2) : 118, 1972; Som Deva & Naithani in *Ind. For.* 100(10) : 638, 1974.

A perennial with stout woody rhizome. Stem more or less scabrid below the nodes. Leaves pale green, 5-10 (-15) mm wide, up to 1 m long. Inflorescence young straw-pale coloured, ripe dirty-straw coloured, not brown. Panicle often 25-40 cm, linear oblong; partial peduncles compound, lower distant; spikes fascicled, resembling those of *C. condensata* Nees. Utricle straight or slightly recurved, ellipsoid, curved-tapering to a spongy, cylindric-cuneate basal part, 4-5 mm by 1.5-2 mm; many-striate, glabrous, not inflated, back linear, very shortly 2 fid; glumes oblong or oblong-ovate, 2-2.75 mm, the awn up to 2 mm long.

Nun Nadi, Jamanwala, Dist. Dehra Dun, Raizada Dehra Dun Herb. No. 79830, 79831 & 79832; in wet sandy soil.

Fl. & Fr. April-June.

Distribution :—From Nepal to Assam, Sikkim, Chota Nagpur, Bihar; Malesia.

Carex thomsonii Boott Illus. 1.1, t. 1, 1858; Clarke in Hk. f. FBI. 6:703, 1894; Kükenthal in Pflanzennr. 4. 20:142, 1909; Nelmis in Reinwardtia 1(3) : 229, 1951; Som Deva & Naithani in Ind. For. 100(10) : 638, 1974.

A perennial. Stem about 30 cm, lignescent with many nodes, densely caespitose, very rigid, black in age, and often shining, perennial, not rarely rooting at top and throwing thence a cluster of stems the next season. Leaves numerous, infolded when dry, narrow, far over topping the inflorescence. Inflorescence often 10-13 cm by about 8 mm, dense, of 25-30 regularly placed brownish, spikes. Style 2-fid; utricle small, plano-convex, thinly obscurely many-nerved with numerous red glands throughout, hardly narrowed into the triangular shortly-notched beak.

Dholkhand, Saharanpur Siwaliks, Shiva Dehra Dun Herb. No. 102298.

Fl. & Fr. Oct.-Dec.

Distribution :—Himalaya and Khasi, from Kumaon to Upper Burma; Tonkin.

Cyperus alulatus Kern in Reinwardtia 1(4) : 463-466, f. 1, 1952; Raizada in Proc. Nat. Inst. Sci. Ind. 24(4) : 201, 1958; Malik & Prasad in Ind. For. 94(12) : 885, 1968; Korlahalli in Bull. Bot. Surv. Ind. 9:237, 1968; Som Deva & Naithani in Ind. For. 100(10) : 659, 1974; *Cyperus iria* Linn. var. *rectangularis* Kükenthal in Pflanzennr. 101 : 152, 1936; *Cyperus iria* sensu Clarke in Illus. Cypt. t. 14, 1907; *Cyperus rectangularis* (Kükenth.) Bennet in Ind. For. 95(10) : 692, 1969.

An annual. Stems triquetrous, 1-45 cm. Leaves as long

as or longer than the stems, 0.4-0.6 cm broad. Spikes up to 3 cm long in a umbellate inflorescence; rachis flexuous, scabrid on the angles; bracts 6-8, unequal, the longest one up to 30 cm long; rays 4-8, unequal, up to 15 cm long; spikelets greenish-yellow, patent, $0.3-0.7 \times 0.2-0.25$; glumes ovate, imbricate, $0.2 \times 0.12-0.13$, keel 7-nerved, winged with a serrulate margin in the upper part; stamens 2; style 2-partite near the base, 0.6-0.7 cm long; nut obovoid, reddish-brown, apiculate, $1.4-1.5 \times 0.8-0.9$ cm.

A distinct species, closely resembling *C. iria*; the spikelets spreading at right angles to the hispid rachis; spinulose back of keel and 7-nerved glumes of which one nerve standing apart are characteristic of this species.

Moradabad Thomson 280; Nalapani Road, Dehra Dun Gamble 23192; Gwalior, Maries 356; Jaunpur, S.K. Singh 25; Balbir Avenue, Dehra Dun, Som Deva 925; Gandhi Park, Dehra Dun, Som Deva 6029; Lachiwala, Dist. Dehra Dun H.B. Naithani 3164; New Forest, Dehra Dun Raizada; H.B. Naithani 1864; Bindal, Dehra Dun C.R. Babu 33233, 33233a.

Abundant as a weed in cultivated ground, rice fields, river beds and waste places.

Distribution :—N.W. Himalaya, Punjab, Uttar Pradesh, Kashmir, Central India, Maharashtra.

Cyperus arenarius Retz. Obs 4:9, 1786; Clarke in Hk. f. FBI. 6:602, 1893; Raizada in Ind. For. Rec. (n.s.) Botany 1(5) : 235, 1939.

A small herb with wiry creeping rootstock often deep down in the sand with vertical branches. Stems solitary, distant, 10-30 cm long. Leaves often over topping stem, rigid and tough, almost nerveless. Spikelets crowded together into a head 1.2-4 cm across, on the summit of the stem, straw-coloured or brown, 8-16 flowered. Bracts 2-3, leaf-like, rigid, the lowest the longest; glumes boat-shaped, strongly 3-nerved. Stamens 3, much longer than the style. Nut black, ovoid, rounded at the apex, 3-angled; style very short, branches linear, longish.

Jaipur, Sadhu Singh.

Distribution :—Sea coast from Sindh to Ceylon & Orissa, Punjab plains; Persia, Arabia.

The plant acts as a sand-binder.

Cyperus articulatus Linn. Sp. Pl. 66, 1753; Clarke in Hk. f. FBI. 6:611, 1893; Kükenth. in Pflanzenr. Heft 101:77, 1936; Maheshwari in Fl. Delhi 355, 1963.

A glabrous, usually leafless sedge. Stems terete, stout,

90-180 cm high, when dry usually with distinct, transverse septa. Umbels compound, primary rays often 10, up to 15 cm long; bracts usually 1×0.5 cm, ovate, scale-like. Secondary rays in corymbs of 8-15 spikelets. Spikelets narrowly linear. Nuts trigonous; style branches linear, 3, exserted.

Hindan River, Delhi, *J.K. Maheshwari* 1157. A water-loving sedge, usually found in standing water of ponds and canals.

Fl. & Fr. April-Oct.

Distribution ;—Bengal to Ceylon. All warm regions.

Cyperus atkinsonii Clarke in Journ. Linn. Soc. 21:109, 1884 et in Hk. f. FBI. 6:603, 1893; Kukenthal in Pflanzenr. Heft 101:271, 1936; Raizada in Proc. Nat. Inst. Sci. India 24(4): 201, 1958; Maheshwari in Fl. Delhi 355, 1963.

An erect, glabrous sedge with a woody rhizome, rootlets woolly. Stems thickened at base. Umbels simple, contracted. Spikelets linear, much compressed, many-flowered, whitish or pale-brown. Glumes closely imbricate.

Occurs in moist or wet soil near canals, ponds and puddles in Delhi, *J.K. Maheshwari*; Delhi, *Raizada* Dehra Dun Herb. No. 113198.

Fl. & Fr. Aug.-Oct.

Distribution :—Kashmir, N.W. Himalaya, Sindh, Pakistan.

Cyperus compressus Linn. var. *pectiniformis* (R. & S.) Clarke in Journ. Linn. Soc. 21:97, 1884; Kukenthal in Pflanzenr. 101:158, 1936; Som Deva & Naithani in Ind. For. 100(10): 640, 1974; *Cyperus compressus* Linn. incl. var. *pectiniformis* Clarke in Hk. f. FBI. 6:605, 1893; Kern in Back. & Bakh f. Fl. Java 3:480, 1968; Kukenthal in Pflanzenr. 101:156, f. 4A-D, 1936; *Cyperus pectiniformis* R. & S. Mant. 2:128, 1824; Nees in Wight Contr. 77, 1834.

Dehra Dun *Meebold* 2524 Vide Kukenthal.

I have never collected this plant; it is being included on the authority of Kukenthal (Pflanzenreich Heft 101:158, 1936) where he cites *Meebold* 2524 from Dehra Dun.

Cyperus compressus Linn. as pointed out by Kern loc. cit., is a very variable species. Extremely tall or low specimens and those with many-flowered spikelets were described as separate species and subsequently reduced to varietal rank and hardly deserve nomenclatural recognition.

Cyperus cyperinus (Retz.) Valck. Sur. Gesl. Cyp. Mal. Arch. 154, t. 6, f. 10, 1898 var. *maximus* (Clarke) Kuk. in

Pflanzenr. Heft. 101:520, 1936; Kern in Fl. Males (Ser. 1) 7(3) : 642, 1974; Som Deva & Naithani in Ind. For. 101 (3):205, 1975; *Mariscus cyperinus* var. *maximus* Clarke, Journ. Linn. Soc. Bot. 34: 43: 1898.

A perennial with very short rhizome; stolons absent. Stem stouter, tufted, up to 3.5 mm thick. Bracts up to 12, very long, up to 60 cm. Rays of the inflorescence up to 16, often well-developed, up to 8 cm. Spikes very dense, up to 1.5 cm wide. Spikelets patent up to 8 mm, 4-flowered. Nut trigonous, ellipsoid, slightly curved, shortly apiculate, brown.

Near General Post Office, Dehra Dun, *H.B. Naithani* 1892 B., on moist sand, rare.

Distribution:—Malesia.

This subspecies shows several characters of *C. cyperoides*, but the nut is that of *C. cyperinus*.

Cyperus cyperoides (L.) O. Kuntze, Rev. Gen. Pl. 3, 2:133, 1898; Kükenthal in Pflanzenreich Heft 101:514, 1936; S.T. Blake in Journ. Arn. Arb. 28:224, 1947; Kern in Reinwardtia 6(1) : 64, 1961 et in Back. & Bakh. f. Fl. Java 3:474, 1968; Singh & Dixit in Ind. For 98(2) : 121, 1972; Som Deva & Naithani in Ind. For. 100(10) : 640, 1974; *Scirpus cyperoides* Linn. Mant. 2:181, 1771; *Mariscus sieberianus* Nees (Linnaea 9:286, 1835 nom nud.) ex Clarke in Hk. f. FBI. 6:622, 1893 et in Illus. Cyp. t. 23, f. 5-6, 1909; *Mariscus cyperoides* (L.) Urb. Sym. Ant. 2, 1:164, 1900.

Perennial with very short rhizome; stolons absent. Stem tufted, triquetrous, rigid, smooth, 20-95 cm by 1.3 mm. Leaves flaccid, flat, gradually long attenuate, scabrid in the upper part, 3-6 mm wide. Spikes exactly cylindrical, with numerous (40-200) spikelets, 2-4 cm by 6-10 mm; rays of the inflorescence 5-17, slender, upto 6 (-10) cm long; spikelets alternately at right angles to the rachis, the lower ones often reflexed, 3-4 mm by 0.5-1 mm; glumes membranous, oblong-ovate; nut trigonous, linear, slightly curved, rufous to castaneous, 3.5-4 by 0.5-1 mm.

Kheere ghat, Mohand Siwaliks *Royle* 188/34; Jaunpur *S.K. Singh* 33; Robber's Cave, *C.R. Babu* 32236; Bindal, *C.R. Babu* 32236a, *Raizada* s.n.

Distribution:—North-West Himalaya alt. 0-2000 m, Assam to Ceylon, Malesia, Australia, Africa.

This species is very common at low altitudes in the adjacent Himalaya but is rare in our area.

Babu's specimen 32236a is referable to var. *subcompositus* (Clarke) Kükenthal, but this cannot be maintained as there are intergrades that connect this with the type. Further more the

character of digitately arranged spikes upon which it is based, is very variable.

Cyperus diaphanus Schrader ex R. & S. Mant. 2:477, 1824; Kern in Blumea 10:644, 1960 var. *latespicatus* (Boeck.) Kern in Fl. Males. (Ser. 1) 7(3):653, 1974; Som Deva & Naithani in Ind. For. 100(10): 641, 1974; *Cyperus latespicatus* Boeck. Flora 42:441 (433) 1859; Clarke in Journ. Linn. Soc. Bot. 21:40, 1884; Kukenthal in Pflanzenr. Heft 101:392, 1936; Kern, Reinwardtia 2:124, f. 13, 1952; *ibid* 3:66, 1954; *Pycreus latespicatus* (Boeck) Clarke in Hk. f. FBI. 6:590, 1893 et Ill. Cyp. t. 3, 1909.

Annual. Stem tufted, rigid, trigonous, small 10-40 cm by 1-2 mm. Leaves flat, gradually narrowed upwards, 1-2.5 mm wide. Inflorescence simple, often contracted, sometimes with 2-3 (-5) rays up to 7 cm long, or reduced to a single head. Involucral bracts 2-3 (-4) patent, the lowest up to 15 cm long. Spikes broadly ovate; rachis short, up to 5 mm, spikelets finally horizontally spreading, approximate, oblong with nearly parallel margins, strongly compressed, sub-obtuse, 1-2 cm by (2.5) 3-4 mm, 20-30 (-40)-flowered; rachilla slightly flexuous, wingless, persistent; internodes about 0.5 mm. Glumes membranous, obliquely patent, keeled, ovate, obtuse, mucous, about 2/3 imbricate, (2.5) 3 by 1.75-2 mm; keel curved, green, 3(-5)-nerved; sides nerveless, shining fulvous to castaneous, margins somewhat undulate. Stamens 2; anthers oblong to oblong-linear, 0.75-1 mm. Style up to 1.5 mm; stigmas 2, about as long as the style. Nut biconvex, laterally compressed, obovate to broadly obovate or elliptic, broadly stipulate, apiculate, 1-1.25 by 0.8-1 mm, rugulose with transverse wavy lines, ultimately black, epidermal cells longitudinally oblong.

Fatehpur, Saharanpur Dist., Raizada s.n. Som Deva 7582; Kansrao, Raizada, Som Deva 7635; Rajpur Som Deva 7659; Chir plantation, Rajpur H. B. Naithani 1884.

Fr. Rainy season.

Distribution.—From Kumaon to Khasi, Bengal, Chota Nagpur, Malabar, Malesia.

This species strikingly resembles *C. unioloides*, but readily distinguished by the 2 stamens (3 in *C. unioloides* and the rugulose nut.

Cyperus eleusinoides Kunth (Enum. 2:39, 1837) var. *subprolixus* Kukenthal in Pflanzenreich Heft 101:145, 1936; Som Deva & Naithani in Ind. For. 100(10): 641, 1974.

This variety which is hardly distinguishable from the typical

variety has been collected only once from moist sand along Tons stream in Sept. 1927 by *Parker* Dehra Dun Herb. No. 44620.

Cyperus flabelliformis Rottb. Descr. Pl. rar. Progr. 22, 1772; Descr. & Ic. 42, t. 12, f. 2, 1773; Clarke, Fl. Trop. Afr. 7:336, 1902; Merrill, Enum. Phillip. Pl. 1:105, 1923; Bailey in Sand. Cyclop. Hort. 1:941, 1950; Kern in Reinwardtia 6(1): 56, 1961 et in Back. & Bakh. f. Fl. Java 3:475, 1968; Singh & Dixit in Ind. For. 98 (2): 122, 1972; Som Deva & Naithani in Ind. For. 100(10): 642, 1974; *C. alternifolius* Linn. ssp. *flabelliformis* Kuk. in Pflanzenr. 101:193, 1936.

A perennial with stout, horizontal rhizome. Stem stout, densely tufted, obtusely trigonous to subterete, sulcate, scaberulous at top, 50-175 cm by 3-8 mm. Normal leaves only present on the first sterile shoots, leaves in flowering stems reduced to long, wide, brownish sheaths. Inflorescence large, decompound, 10-30 cm across. Involucral bracts numerous, up to 20, distinctly spaced, flat, obliquely patent to reflexed, rather abruptly acuminate, nearly equal in length, much overtopping the inflorescence, 25-50 cm by 8-15 mm. Spikelets digitately arranged, stellately spreading, in clusters of 3-7 (-15), ovate to oblong-linear, compressed, 10-40-flowered, 5-10 by about 2 mm; rachilla straight, wingless, persistent; internodes about 0.25 mm. Glumes membranous, obliquely patent, ovate, obtuse, acutely keeled, mucronulate, finally 3-5-nerved, with green keel and shining ferruginous sides often tinged red. Stamens 3; anthers linear. Nut trigonous, broadly ellipsoid or slightly obovoid, apiculate, yellowish brown 3/5-3/4 by 0.5 mm.

Circular Road, Dehra Dun, (Cultiv.), *Som Deva* 6375; Pritam Road, Dalanwala, Dehra Dun, (Cultiv.), *Raizada*; Rajpur Road, *H.B. Naithani*, Ser. II. No. 76: (Cultivated).

Fl. & Fr. Oct.-Jan.

Distribution.—Native to Arabia, tropical and South Africa; often cultivated in India and elsewhere as an ornamental; it has run wild in Queensland, New Caledonia, Hawaii and is found as an escape from cultivation in Malaysia.

The very closely related *C. alternifolius* Linn., differs by its smooth stems, narrower leaves, lanceolate glumes and narrowly oblong, blackish nuts measuring 1 by 1/3 mm. It is native to Madagascar, Mauritius, and the Mascarenes; not found growing wild in India.

Cyperus halpan Linn. Sp. Pl. 45, 1753 ('haspan'); Clarke in Journ. Linn. Soc. Bot. 21:119, t. 3, f. 23, 24, t. 4, f. 34, 1884 et in Hk. f. FBI. 6:600, 1893; Kükenthal in Pflanzenr. 101:247, f. 28 E-G, 1936; *Raizada* in Ind. For. Rec. (n.s.) Botany 1(5):

234, 1939; Kern in Reinwardtia 2:116, 1952, 3:38, 1954 and in 6:56, 1961 and in Back. & Bakh. f. Fl. Java 3:476, 1968; S.T. Blake in Journ. Arn. Arb. 28:219, 1947; Singh & Dixit in Ind. For. 98(2):128, 1972; Som Deva & H.B. Naithani in Ind. For. 100(10):642, 1974; Kern in Fl. Males. (Ser. 1) 7(3):624-625, f. 56-57, 1974.

A perennial, but often flowering the first year, with short rhizome and reddish roots. Stems slender, weak, solitary tufted, triquetrous to almost 3-winged, often with a longitudinal median rib on each side, smooth, 10-40 cm. Leaves flat, smooth or scaberrulous at the top, 2-5 mm wide; lower sheaths scarious, inflated, cinnamomeous or reddish; sometimes all the leaves reduced to ovate or lanceolate appendages of the sheaths. Inflorescence compound or decompound, loose to rather dense, up to 15 cm across. Involucral bracts 2-3, all shorter than the inflorescence or are rather longer, up to 10 (-15) cm. Primary rays numerous, up to 20, obliquely patent, slender, smooth, up to 15(-20) cm, secondary ones up to 2.5 cm, tertiary ones when present very short. Spikelets digitately arranged, in clusters of 3-6(-10), stellately spreading, linear to linear-lanceolate, acute, strongly compressed, 10-30(-40)-flowered, 5-10 by 1-2 mm; rachilla completely hidden by the glumes or almost so, straight, persistent; internodes 1/4-1/3 mm. Glumes membranous, suberect, keeled, oblong-ovate, rather obtuse, muticous, 1-1.5 mm long, 1/2-2/3 imbricate; keel 3-nerved, green, nerveless. Stamen 1; anther oblong about 0.5 mm, with bristly appendages of the connective. Stigmas 3. Nut trigonous, broadly obovoid, broadly stipitate, shortly apiculate, densely granulate to verruculose, whitish later on yellowish, 0.4-0.5 mm long and wide.

North Kheri *Sri Ram*; Bahraich *Sri Ram*; Kansrao, Dehra Dun District, Raizada s.n., Som Deva 7647B, H.B. Naithani 1893.

Distribution :—Tropical and subtropical regions of the whole world; abundant in rice fields throughout India.

The correct spelling should be *halpan* not *haspan*. Linnaeus misread the vernacular name *halpan* as *haspan*. According to Art. 73 of the Code (example of *Gluta rhengas*) this orthographic error must be corrected.

Cyperus halpan Linn Sp. Pl. 45, 1753 ('haspan') ssp. *juncoides* (Lamk.) Kuk. in Fedde, Rep. 23:184, 1926 et Pflanzenreich Heft 101:249, 1936; Kern in Fl. Males. (Ser. 1) 7(3):625, 1974; Som Deva & Naithani in Ind. For. 101(3):205, 1975; *C. juncoides* Lamk. Ill. 1:147, 1791.

Differs from ssp. *halpan* by: rhizomes creeping; stems usually more robust, up to 80 (-100) cm tall, at the base

surrounded by long, bladeless, reddish sheaths, rarely leaf-blades well developed. Spikelet often longer, 1.5 mm wide; internodes of the rachilla 1/3-1/2 mm. Glumes less densely imbricate, not completely hiding the rachilla, narrower, mucronulate, 1.25-1.75 mm long. Stamens (2-)3; anthers linear-oblong. Nut slightly larger, 0.55-0.75 mm long.

Kansrao swamp, Dehra Dun, *Raizada* s.n., *Som Deva* 7647A; localized in swamps.

Distribution :—Pantropical.

Cyperus halpan is extremely polymorphic. The two spp. *halpan* Kern (Fl. Males. (Ser. 1) 7(3):625, 1974) & ssp. *juncooides* (Lamk.) Kükenthal (Fedde, Rep. 23:184, 1926; Pflanzenreich Heft 101: 249, 1936; Kern in Fl. Males. (Ser. 1) 7(3): 625, 1974) are connected by numerous intermediates. The ssp. *halpan* is found in the region of the flora.

Cyperus metzii (Hochst.) Mattsf. et Kükenthal in Pflanzenreich Heft 101:612, 1936; Kern in Reinwardtia 10(2): 640, 1960; *Som Deva* and *Naithani* in Ind. For. 100(10): 643, 1974; *Kyllinga squamulata* Thonn. ex Vahl, Enum. 2:381, 1806; Clarke in Hk. f. FBI. 6:589, 1893 and in Illus. Cyp. t. 1, 1909; *Kyllinga metzii* Steud. Syn. Pl. Cyp. 70, 1855.

An annual up to 36 cm high with tufted stems; roots fibrous. Leaves often longer than stem, about 2 mm wide. Heads about 4 mm in diameter, green or brown. Spikes 1-3, ovoid; flowering glumes scarcely acute its keel winged by a broad hyaline incise-toothed crest. Spikelets about 2 mm long, maturing 1 nut only. Nut brown.

Kishanpur, Dehra Dun Dist., *Som Deva* 2769; New Forest, Dehra Dun, *Raizada*, *H. B. Naithani* 7164; Chukhuwala, Dehra Dun, *H.B. Naithani* 3160.

Distribution :—Western India, Kashmir, Garhwal, Mt. Abu, Kanara; tropical Africa.

This species frequently occurs in dry situations on gravel along the road and path.

Cyperus nutans Vahl, Enum. 2:363, 1806; Clarke in Hk. f. FBI. 6:607, 1893; Kükenthal in Pflanzenr. Heft 101:144, 1936; Kern in Reinwardtia 3(1): 31, 1954 & 6(1):54, 1961 and in Back. & Bakh. f. Fl. Java 3:282, 1968 in Fl. Males. (Ser. 1) 7(3): 609-610, 1974; *Som Deva* and *Naithani* in Ind. For. 100(10):644, 1974; *Koyama* in Quart. Journ. Taiwan Mus. 14:168, 1961; *Maheshwari*, Fl. Delhi 357, 1963.

A herb 30-90 cm high; rhizome tuberous. Stem trigonous. Leaves as long as the stem, 5-9 mm broad, margin scabrous,

revolute. Umbels decomposed; primary rays 8-11, up to 15 cm long; bracteoles short. Spikelets 5-8 \times 1 mm, brownish-green, 5-11-flowered, subcompressed; rachilla flexuous, with narrow hyaline easily detachable wings. Glumes distinct, about 1.7 mm long, elliptic-oblong, apex obtuse and minutely apiculate, margins hyaline. Stamens 3; anthers linear-oblong, muticous. Style short; stigmas 3, longer than style, exserted. Nut about 1.3 mm long, narrowly obovoid-oblong, trigonous, apiculate, pale yellow when ripe.

Robber's Cave, Dehra Dun *Raizada* s.n., *Som Deva* 1043; Ramgarh, Dehra Dun Dist., *Som Deva* 5048; Manu Swamp, Rishikesh, *Som Deva* 5951 & 5965; Lachiwala, Dehra Dun *Som Deva* 6000; New Forest, Dehra Dun, *Raizada*; *H.B. Naithani* 7167; Clement Town, Dehra Dun, *H.B. Naithani* 7168; Roshnara Gardens, Delhi *Mareshwari* 1048.

Distribution :—From the Punjab to Assam and Ceylon, China, Malasia.

Cyperus nutans Vahl, var. *subprolixus* Kukenthal in *Pflanzenr.* Heft 101:146, 1936; *Som Deva* & *Naithani* in *Ind. For.* 100(10): 644, 1974.

Dehra Dun *R.N. Parkar* (Kukenthal l. c.).

There are no specimens of this in Herbarium Dehra Dun. From the description it appears to be only a depauperate var. *nutans*.

Cyperus ohwii Kuk. in *Fedde, Rep.* 29:197, 1931 et in *Pflanzenr.* Heft. 101:60, f. 8 A-E. 1935; Ohwi, *Mem. Coll. Sc. Kyoto Imp. Un.* B 18:127, 1944; Kern, *Reinwardtia* 2:97, f. 1, 1952; Back. & Bakh. f. *Fl. Java* 3: 479, 1968 et *Fl. Males* (Ser. 1) 7(3): 602, 1974. *Cyperus elatus* Linn. var. *macronux* Clarke, *Journ. Linn. Soc. Bot.* 21:190. 1884 et *Hk. f. Fl. Br. Ind.* 6:618, 1893; Kuk. in *Pflanzenr.* Heft 101:60, 1935 *pro parte*; *Som Deva* & *Naithani* in *Ind. For.* 101 (3): 205, 1975.

A perennial closely allied to *C. elatus* Linn. usually more robust and with broader, up to 18 mm wide leaves. Cladophylls with small keels. Spikes very dense, (usually about 70 spikelets to the spike), 6-8 mm (ultimately up to 10 mm) wide. Spikelets obliquely patent, linear-oblong, 1.5 mm wide; wings of the rachilla lanceolate, 1/5 mm wide. Glumes ovate to elliptic, 1.75-2 by 1-1.25 mm. Anthers with a large setulose appendage of the connective about half as long as the anther cells. Nut oblong-ellipsoid about 1.2 by 2/5 mm long.

New Forest, Dehra Dun, along canal banks, *Raizada* s.n., *H.B. Naithani* 7158.

Distribution.—Bengal, S.E. Asia, Indo-China, Japan.

Cyperus platystylis R. Br. Prodr. 214, 1810; Clarke in Hk. f. FBI. 6:598, 1893; Kükenthal in Pflanzenr. Heft 101:185, f. 21, 1936; Raizada in Ind. For. Rec. (n.s.) Botany 1(5): 234, 1939; S.T. Blake in Journ. Arn. Arb. 28:215, 1947; Kern, Reinwardtia 2: 112, f. 8, 1952 and in Back. & Bakh. f. Fl. Java 3:472, 1968 and in Fl. Males. (Ser. 1) 7(3): 618, 1974.

A stoloniferous robust herb with stem and leaves up to 75 cm long. Leaves up to 1.5 cm wide with scabrous cutting edges. Inflorescence compound, but heads often very short-peduncled, so that they appear as one, 2.5-25 cm across. Spikelets bright brown, umbellately or digitately clustered, 0.4-1.3 cm long. Bracts leaf-like, 5-45 cm. Nut unequally trigonous, dorsally compressed, with corky, much thickened angles, ellipsoid, apiculate, 1.75-2 by 1 mm, greyish brown to blackish.

North Kheri, *Sri Ram*.

Distribution.—From Bengal and Burma to Ceylon and Penang, Malesia to N. Australia.

Cyperus pumilus Linn. var. *membranaceus* (Vahl) Kükenthal in Pflanzenr. Heft. 101:376, 1936; Kern in Reinwardtia 3(1): 50, 1954; Som Deva & Naithani in Ind. For. 100(10): 645, 1974; *Cyperus membranaceus* Vahl, Enum. 2:380, 1806.

Kaunwali Road, Dehra Dun, *H.B. Naithani* Dehra Dun Herb. No. 148825. Rare in open ground.

Fl. & Fr. Oct.-Nov.

Cyperus rotundus Linn. ssp. *tuberosus* (Rottb.) Kükenthal in Pflanzenr. Heft 101:113, 1936; Kern in Reinwardtia 6(1): 53, 1961; Som Deva & Naithani in Ind. For. 100(10): 645, 1974; *Cyperus tuberosus* Rottb. Descr. et Ic. 18, t. 7, t. 1, 1773; Clarke in Hk. f. FBI. 6:616, 1893; Koyama in Quart. Journ. Taiwan Mus. 14:170, 1961.

A perennial sedge, stolons slender, elongated, bearing elliptic or subglobose, small to large tubers; stems erect, 5-70 cm high, triquetrous especially near the top, base usually tuberosus or subtuberosus. Leaves 5-55 × 0.2-0.55 cm, flat, 1-nerved, acuminate; umbels simple or compound; bracts usually 3, very small, rays 3-8, up to 10 cm long. Spikelets 6-40 × 2 mm, straw-coloured to reddish-brown, 10-50-flowered, compressed; rachilla with hyaline wings. Glumes about 3 mm long, densely imbricate, usually 3- or 5-nerved, apex obtuse and minutely apiculate, margin hyaline. Stamens 3, slightly longer than the style, much exerted. Nut about 1.7 mm long, greyish-black, ellipsoid, or elliptic-obovoid, trigonous, minutely apiculate.

Dehra Dun : Clement Town, *H.B. Naithani* 2747; New

Forest, Raizada, H.B. Naithani 1891. In ditches and canal banks.

Fl. & Fr. Throughout the year, but mainly in monsoon.

Distribution:—Bengal, Deccan Peninsula, Ceylon, Mauritius, Australia.

Cyperus sanguinolentus Vahl, Enum. 2:351, 1806. ssp. *cyrtostachys* (Miq.) Kern, Reinwardtia 3:57, 1954; Fl. Males. (Ser. 1) 7(3): 647, 1974; Som Deva & Naithani in Ind. For. 101(3): 205, 1975; *C. sanguinolentus* f. *cyrtostachys* Kuk. Pflanzenr. Heft 101: 387, 1936.

The ssp. *cyrtostachys* differs from ssp. *sanguinolentus* in having stamens 2. Nut smaller 4/5-1 by 3/5-4/5 mm. Leaves flat, 2-4 mm wide, involucre bracts spreading. Inflorescence more or less open, or when capitate, with many spikelets. Glumes 1.5-2 mm long, ferruginous to whitish, often tinged with red.

Kuanwala, Dehra Dun, Dist., Raizada s.n., H.B. Naithani 1900, in marshy places.

Distribution:—Throughout Malesia.

Cyperus sanguinolentus Vahl, var. *macronux* (Clarke) Kuk. in Pflanzenr. Heft 101:387, 1936; Som Deva & Naithani, Ind. For. 101(3): 205, 1975.

Dehra Dun, Raizada Dehra Dun Herb. No. 82259 (Sept. 1939), in marshes.

Cyperus sanguinolentus Vahl, ssp. *sacer* Korla in Bull. Bot. Surv. Ind. 9(1-4): 235, 1967; Som Deva & Naithani in Ind. For. 100(10): 646, 1974.

Subsp. *sacer* is allied to *C. sanguinolentus* Vahl, ssp. *sanguinolentus* & *C. sanguinolentus* Vahl. ssp. *teysmanni* (Boeck.) Kern, but differs from the first mainly in having stamens 2, nuts suborbicular and relatively smaller up to 1 mm long only and leaves up to 1.5 mm wide, bracts spreading; and from the second in having leaves 1.5 mm wide, inflorescence paucispiculate, spikelets up to 3 mm wide, glumes with or without distinct depression on sides.

Rajpur, Raizada s.n., Som Deva 2890; Ramgarh, Som Deva 5925; Siwalik, Kiri Rau, Som Deva 6120; Rajpur, H.B. Naithani 1885 A & 1885 B.

Distribution:—West Bengal & Dehra Dun, Uttar Pradesh.

Cyperus serotinus Rottb. Progr. 18, 1772 et Descr. et Icon. 31, 1773; Kükenthal in Pflanzenr. Heft 101: 316, 1936; Som Deva & Naithani in Ind. For. 100(10):645, 1974; *Juncellus serotinus* Clarke in Hk. f. FBI. 6:594, 1893.

Stem erect 12-40 cm. Leaves often as long as stem up to 4 mm broad. Bracts 3-5, up to 20 cm, leaf-like. Umbel rays 3-6, up to 12 cm long, very unequal, rather shorter umbellules shortly corymbose or capitate; bracteoles short. Spikes of 5-40 spikelets. Spikelets 12-30-flowered, turgid; glumes approximate; margins narrowly scarious. Stamens 3. Style short, 2-fid, branches as long as nut. Nut obovoid, obtuse, smooth, dark-brown.

New Forest, Dehra Dun, Raizada s.n., H.B. Naithani 1890; Som Deva 7663. Found growing in a ditch along the canal mixed with *Cyperus pangorei* Rottb.

Distribution: —Kashmir, Punjab. From Spain to Japan.

Cyperus sesquiflorus (Torr.) Mattf. & Kuenthal Pflanzenr. Heft 101:591, f. 6 E-J, 1936; Kern in Fl. Males (Ser. 1) 7(3): 658, 1974. *Kyllinga sesquiflora* Torr. Ann. Lyc. N. York 3:287, 1836. var. *subtriceps* (Nees) Koyama, Quart. J. Taiwan Mus. 14:191, 1961; *Kyllinga cylindrica* Nees in Wight. Contr 91, 1834, incl. var. *subtriceps* Nees; Clarke in Hk. f. FBI. 6:588, 1893, excl. Specim. malacc; Murty & Singh in Proc. Nat. Inst. Sci. 27(B) 1:16, 1961; *C. cylindricus* Champn. 1878; *Cyperus sesquiflorus* var. *cylindricus* Kuk. Pflanzenr. 101:593, 1936; Bot. Jahrb. 70:463, 1940; Kern, Reinwardtia 3 65, 1954; *C. kernianus* Ohwi & Koyama, J. Jap. Bot. 30:126, 1955; Koyama, Act. Phytotax. Geobot. 16:55, t. 4. f. B-C, 1955; *C. sesquiflorus* ssp. *cylindricus* (Nees ex Wight) Koyama, Bot. Mag. Tokyo 83: 187, 1970.

A perennial with very short rhizome. Stems tufted, triquetrous, smooth, 10-30 cm by 1 mm. Leaves rigidulous, flat, gradually acuminate, scabrid on the margins in the upper part, 2-4 mm wide. Inflorescence capitate, whitish, finally straw-coloured, consisting of a terminal cylindrical head 10-12 by 4-5 mm, and 0-2 lateral, subglobose, sessile heads, much smaller than the terminal one. Invol. bracts 3-5, finally reflexed, upto 10 cm. Spikelets numerous, patent, elliptic, strongly compressed, though somewhat turgid, maturing 1 nut, 2-2.5 by 1-1.25, falling off as a whole; rachilla cylindric, disarticulating at the base. Glumes hyaline, 1st & 2nd small, 3rd & 4th nearly equal in length, broadly ovate, acute or apiculate, with smooth or hardly spinulose sharp keel, strongly 9-11- and 5-7-nerved, 2-2.5 mm. Stamens 2; stigmas 2. Nut biconvex, laterally compressed, obovate, or broadly obovate, obtuse, shortly apiculate, black, about 1.5 by 1 mm.

Mawana Road, Meerut, 15-11-1958, Murty & Singh 1.

Distribution :—Trop. Africa, S.E. Asia, Ceylon and India to Yunnan, Formosa and Malesia.

The typical variety *sesquiflorus*, which occurs in tropical Africa, warm parts of N. & S. America and Australia differs from var. *subtriceps* mainly by the larger, 3-3.5 mm long spikelets.

Cyperus tenuiculmis Boeck. in Linnaea 36: 286, 1870; Kern in Reinwardtia 3:28, 1954 and 6(1): 53, 1961; Som Deva & Naithani in Ind. For. 100(10): 646, 1974; *Cyperus zollingeri* (non Steud.) sensu Clarke in Hk. f. FBI. 6:613, 1893; Kükenthal in Pflanzenr. Heft 101:133, 1936 incl. var. *condensatus* Kükenth.; Kern in Reinwardtia 2:108, f. 6, 1952.

Glabrous with short, horizontal, woody rhizome. Stems solitary but not distant, up to 70 cm, slender for their length, triquetrous. Leaves 2/3 stem, 2 mm broad. Umbels large, straggling, ray 4-10 up to 24 cm with radioles of secondary umbels up to 8 cm, but small 1-headed examples are frequent, with all intermediate forms; bracts as long as umbels or greatly overtopping it. Spikes large, open, rachis glabrous. Spikelets 3-16, often 2.5 cm long, 20-flowered, compressed. Glumes boat-shaped, ovate, obtuse, 7-11-nerved, in fruit scarcely imbricated; rachilla slender, in fruit flexuous, wings oblong hyaline, separating. Stamens 3. Nut triquetrous, obtuse; style shorter than nut, slender, branches linear, slender.

Ramgarh swamp, Dehra Dun Dist., D.S. Bist 299.

Distribution :—Throughout India, Assam, Nepal, Ceylon.

Cyperus unioloides R. Br. Prodr. Fl. Nov. Holl. 216, 1810; Clarke in Journ. Linn. Soc. Bot. 21:60, 1884; Kükenthal in Pflanzenr. Heft 101:338, f. 23, 4 E-G, 1936; Kern in Reinwardtia 2(1): 124, f. 12, 1952 & 6(1): 61, 1961, in Back & Bakh. f. Fl. Java 3:471, 1968 & in Fl. Males. (Ser. 1) 7(3): 648, 1974; Som Deva & Naithani in Ind. For. 100(10): 647, 1974; Naithani & Raizada in Ind. For. 103, 1977 in press; *Pycneus angulatus* Nees in Linnaea 9:283, 1834; Clarke in Hk. f. FBI. 6:593, 1893 & in Ills. Cyp. tab. 4 f. 1-5, 1909; *Pycneus unioloides* Urb. Symb. Ant. 2:164, 1900; *Cyperus angulatus* Nees in Wight, Contrib 73, 1834.

Perennial (always ?) with short rhizome. Stem slender, somewhat tufted, rigid, triquetrous, smooth or scaberrulous at top, up to 90 cm by 1-2 mm. Leaves flat to conduplicate, rigid, margin scabrid on upper part, 2-4 mm wide. Inflorescence simple, loose to contracted, 3-7 by 6-9 cm. Involucral bracts 2-4, p. tent, the longest much overtopping the inflorescence, up to 20 cm. Rays 3-6, suberect, 6 cm. Spikes broadly ovoid, 3 cm long

and wide, with 4-12 spikelets; rachis glabrous, up to 1 cm. Spikelets patent, oblong or lanceolate, compressed but slightly turgid, acute 10-20(-30)-flowered, 8-15(-25) by 4-5 mm; rachilla flexuous, wingless, persistent; internodes $3/5$ - $3/4$ mm. Glumes chartaceous, divergent, ovate to oblong, keeled, acute, muticous, $3/4$ imbricate, 3 $3/4$ -4 by 2 $1/2$ -3 mm; keel acute, 3-nerved; sides nerveless, shining yellowish green to brown; margins not or hardly hyaline, undulate when dry. Stamens 3, anther linear. Style long 1.5-3.5 mm, stigmas 2, up to 3 mm. Nut relatively small, biconvex, laterally compressed, short-elliptic to slightly obovate, shortly apiculate, shining black, $1-1\frac{1}{2}$ by 4-5-1 mm; epidermal cell isodiametric.

Ramgarh, Dehra Dun Dist., Som Deva 5930 & 7144; a sedge in swamp; Kansro Swamp, Dehra Dun Dist., Raizada s.n., H.B. Naithani 3171.

Fl. & Fr. Rainy season.

Distribution :—Khasi Hills, Assam, Nilgiri, Tamilnadu, Dehra Dun, Uttar Pradesh, Bailadila, Madhya Pradesh; Nepal; Pan-tropic.

Eleocharis acutangula (Roxb.) Schult. in R. & S. Mant. 2:91, 1924; Troupin, Fl. Sperm. Parc. Nat. Garamba 108, 1956; Andrews, Flow. Pl. Sudan 3:359, 1956; Kern in Reinwardtia 6(1) : 35, 1961; Back. & Bakh. f. Fl. Java 3:461, 1968 and in Fl. Males. (Ser. 1) 7(3) : 525-526, 1974; Som Deva & Naithani in Ind. For. 100(10) : 647, 1974; *Scirpus acutangulus* Roxb. Fl. Ind. 1:216. 1820; *Scirpus fistulosus* Poir. Ency. 6:749, 1804 non Forsk. 1775. *Eleocharis fistulosa* Schult. in R. & S. Mant. 2:87. 1824; Clarke in Hk. f. FBI. 6:626. 1893 and in III. Cyp. t. 35, f. 1-4, 1909; S.T. Blake in Journ. Arn. Arb. 28:226, 1947; Koyama, Journ. Fac. Sci. Un. Tokyo III, 8:98, 1961; Singh & Murty in Journ. Bom. Nat. Hist. Soc. 63(2) : 462, 1966; Singh & Dixit in Ind. For. 98(2) : 124, 1972.

A rush-like caespitose herb, 30-90 cm high; rhizome stoloniferous. Stem tough, terete, glabrous, triquetrous at the top. Spikelets terminating the stem, embraced at the base by a short rounded bract, cylindric, acute, dusky green, 2-4 cm high, as broad as stem. Glumes laxly imbricate, much striated, sub-erect, obovate, subacute. Bristles 6, slightly longer than the nut, brown. Nuts ovoid, faintly striate, 1.5-2 by 1.25-1.5 mm, pale or dark brown, tipped with persistent style bases.

Amhera, Meerut, Murty & Singh 2495; Jaunpur, S.K. Singh 27; Harawala, Dehra Dun, Raizada s.n., Som Deva 5968; H. B. Naithani 3170.

Fl. & Fr. Oct.-Dec.

Distribution :—Nepal & Assam to Burma and Ceylon, Malesia, Tropics generally.

This species can be readily distinguished in the field from other species of the genus found in the Upper Gangetic Plain by its sharply triquetrous stem at the top.

After Troupin l. c. had pointed out that the correct name of this species is *E. acutangula*, not *E. fistulosa*, Koyama l. c. accepted again the latter combination in ascribing it to Link, Jahrb. Gewacksk 3:78, 1820. However as already pointed out by Kern (1974) the combination was not definitely made there ("*Scripus fistulosus*.....ist ebenfalls eine *Eleocharis*").

Sprague (Kew Bull. 1928:352, 1928) pointed out that *Eleocharis* R. Br. (Prodr. 1:224, 1810) is the correct generic name for this taxon, even though *Heleocharis* Lestib. (Ess. Cyperac. 41, 1819) is more appropriate than *Eleocharis*.

Eleocharis congesta D. Don, Prod. Fl. Nepal 41, 1825; Clarke in Hk. f. FBI. 6:630, 1893; Svens. Rhodora 41:102, t. 546, f. 2, 1939; Koyama, Contr. Inst. Bot. Un. Montreal n. 70: 37, 1957; J. Fac. Sc. Un. Tokyo III, 8:89, 1961; Kern in Reinwardtia 6(1):35, 1961; Back. & Bakh. f. Fl. Java 3:461, 1968; Singh & Dixit in Bull. Bot. Soc. Beng. 23(2): 201, 1969 and Ind. For. 98(2):124, 1972; Kern in Fl. Males. (Ser. 1) 7(3): 532-533, 1974; Som Deva & Naithani in Ind. For. 100(10):647, 1974; *E. pellucida* Presl, Rel. Haenk. 1:196, 1828; Svens. Rhodora 41:101, 1939; Koyama Contr. Inst. Bot. Un. Montreal n. 70:37, 1957; *E. afflata* Steud. (in Zoll. Syst. Verz. 1:62, 1854 nom. nud.) Syn. 2:76, 1855; Clarke in Hk. f. FBI. 6:627, 1893; *E. subvivipara* Boeck. Linnæa 36:424, 1870; Clarke in FBI. 6:629, 1893; Ill. Cyp. t. 37, f. 13-16, 1909.

A tufted annual or perennial sedge up to 40 cm. Stems more or less angular-ribbed, but not actually quadrangular. Sheaths appressed, often purplish at base, muticous or with a minute mucro at the oblique or very oblique mouths. Spikelets ovoid or lanceolate, acutish, terete, densely several-to many-flowered, 3-9 by 1.5-3 mm, often proliferous at the base, pale, ferruginous, often tinged with red. Glumes oblong-ovate to lanceolate, 1.5-2 mm. Bristles 6, slender, retrosely scabrous, slightly to distinctly longer than the nut, at first whitish, finally ferruginous. Stamens 2-(-3). Style 3-fid. Nut trigonous, obovoid, smooth, yellowish green to olivaceous, 4/5-1 mm long. Style base shortly pyramidal, triangular, as long as or slightly longer than wide, 1/3-1/2 as broad as nut.

Jaunpur, S.K. Singh, 13; Karuapani, Dehra Dun, Raizada s.n., Som Deva 7264, H.B. Naithani 3987.

Distribution :—From India to China and Japan.

Eleocharis congesta & *E. pellucida* are treated as specifically distinct by Svenson, but distinguished only by the thicker, rigid stems of the former. Koyama, J. Fac. Sc. Un. Tokyo, III, 8:89, 1961, assigns varietal rank to *E. pellucida* (*E. congesta* var. *japonica* (Miq.) Koyama,) distinguishing it from *E. congesta* var. *congesta* by the capillary stems, the small spikelets up to 7 mm by 1-4/5 mm and the small less than 1-1/5 mm long glumes. As pointed out by Kern in Fl. Males. J.c., Clarke's suggestion, *E. congesta* might be a western variety of *E. afflata* (= *E. pellucida*), cannot be maintained.

Eleocharis tetraquetra Nees in Wight, Contr. Bot. Ind. 113, 1834; Clarke in Hk. f. FBI. 6:630 1893 et Ill. Cyp. t. 37, f. 17-20, 1909; Koyama, Contr. Inst. Bot. Un. Montreal n. 70:38, 1957; J. Fac. Sc. Un. Tokyo III, 8:91, 1961; Kern in Back. & Bakh. f. Fl. Java 3:461, 1968 & Fl. Males. (Ser. 1) 7(3): 531-532, 1974; Singh & Dixit in Ind. For. 98(2): 125, 1972; Som Deva & Naithani in Ind. For. 100(10): 648, 1974.

A perennial, with short rhizome; long slender stolons sometimes present. Stems erect, tufted, slender, rigid, acutely 4-angled, 1-1.5 mm thick, (15-) 30-70 cm long. Spikelets ovoid to oblong-ellipsoid, densely many-flowered, ferruginous to brown 10-20 by 3-5 mm. Glumes 4 × 3.4 mm long. Bristles 6, coarse, flat, densely barbellate to almost plumose, rufous, about as long as or slightly exceeding the nut. Style 3-fid. Stamens 2-3. Nut obtusely trigonous, compressed, shining, yellowish to brown, 1-1/4—1-1/2 by 9/10—1-1/5 mm; style-base large, cap-like spongy, fuscous, 1/2-3/4 as long and 1/2-4/5 as wide as the nut.

Ramgarh. Dehra Dun dist., Som Deva 5931 & 6127, Raizada s.n., H.B. Naithani 3173.

Locally abundant in fresh water swamp, both in sunny and shady situations.

Distribution: —Throughout India in the hills from Kumaon to Sikkim and Khasi Hills, E. Asia. Australia.

Fimbristylis aphylla Steud. (in Zoll. Syst. Verz. 1:61, 1854 nom. nud.) Syn. 2:114, 1855; Kern in Blumea 8(1): 117, 1955; in Back. & Bakh. f. Fl. Java 3:464, 1968 and in Fl. Males. (Ser. 1) 7(3): 552, 1974; Som Deva & Naithani in Ind. For. 100(10): 649, 1974; *F. quinquangularis* var. *crassa* Clarke in Hk. f. FBI 6:644, 1893.

A glabrous, densely tufted perennial. Stems erect, prominently 4-5 angled, almost winged, 30-60 (-125) cm by 2-3 mm. Leaves of the flowering stems reduced to 3 or 4 rather loose, bladeless, obliquely truncate, up to 20 cm long sheaths; those of

the sterile shoots well developed, rather abruptly acuminate, with prominent mid rib and scabrid margins, up to 30 cm by 2-4 mm; ligule absent. Inflorescence compound or decompound, open, with many spikelets (2-) 4-10 cm long and wide. Involucral bracts 2-3, much shorter than the inflorescence, 1-2 cm long. Spikelets solitary, ovoid, terete, acute, densely many-flowered, in scabrid peduncles, 2.5-3.5 by 1.5-2 mm; rachilla winged. Glumes hardly keeled, mucous, 1.5 mm long; stamens 1-2; nut obtusely trigonous, 0.7-0.75 mm by 0.4-0.5 mm.

Haldwani, *Parker* Dehra Dun Herb. No. 45204; Dehra Dun, *Parker* Dehra Dun Herb. No. 44947; Mothronwala, *Raizada* s.n., *Som Deva* 2080; *H. B. Naithani* 1958 & 5230; Ramgarh swamp, *Som Deva* 59324; Golatappar 7B block Swamp, *Som Deva* 5374; Manu Swamp, Rishikesh, *Som Deva* 2739, *H. B. Naithani*. Ser. II No. 25.

Parker's specimens from Haldwani & Dehra Dun referred to above were originally identified as *F. complanata* (Retz.) Link., but are in my opinion referable to *F. aphylla* Steud.

Gregarious and colonising vast areas of slow moving shallow water streams of Dehra Dun swamps. *Som Deva's* specimens from Dehra Dun referred to 'above' match in every respect with the description of this species as given by Kern, except that instead of 2 stamens there are always 3 stamens. It may possibly prove to be a new variety.

Distribution :—S.E. Asia, from India to Indo-China.

Fimbristylis fusca (Nees) Clarke in Hk. f. *FBI*. 6:649, 1893; S.T. Blake in *Journ. Arn. Arb.* 35:211, 1954; Kern in *Blumea* 8(1): 125 & 158, 1955, in *Reinwardtia* 6(1):43, 1961, in *Blumea* 15(2): 435, 1967, in *Back & Bakh. f. Fl. Java* 3:468, 1968 and in *Fl. Males.* (Ser. 1) 7(3): 567, fig 42, 1974; *Som Deva & Naithani* in *Ind. For.* 10(10): 650, 1974; *Abildgaardia fusca* Nees in *Wight, Contr.* 95, 1834; Koyama J. *Fac. Sc. Un. Tokyo* III, 8:118, 1961; *F. stenochlaena* Kukenth. *Mitt. Thur. Bot. Ver. N.F.* 50:11, 1943; S.T. Blake in *Journ. Arn. Arb.* 35:220, 1954.

A perennial with short, woody rhizome clothed with the remains of decayed leaf-sheaths. Stem tufted, rigid, angular-sulcate, often scabrid-pilose just below the inflorescence, otherwise glabrous and smooth, 20-50 cm by 0.5-1 mm. Leaves much shorter than stem, (often scarcely 0.25 m long), basal except for one somewhat higher on the stem, rather stiff, flat, exactly linear, abruptly pointed, glabrous or pubescent especially beneath, scabrid at top, (1-) 2-4 mm wide, ligule absent. Inflorescence compound to supra-decompound, loose with several to very nume-

rous spikelets, up to 10 cm long. Spikelets 5-10 mm by 2-2.5 mm, glumes acute, 4-6.5 mm long. Stamens 3; anthers 1.5-2 mm long, style 3-6 mm long; nut obovate, cuneate at the base, densely verruculose about 1 mm by $3/5-3/4$ mm, whitish to brownish; apidermal cells isodiametric.

Ramgarh Swamp, *Som Deva* 7565; Clement Town, Dehra Dun, *Raizada* s.n., *H.B. Naithani* 1861.

Distribution :—From Nepal and India through Thailand and Indo-China to S. China and Japan.

According to Kukenthal *F. stenochlaena* Kuk. differs from *F. fusca* by the broader leaves (2 mm) with light-coloured sheaths, the twice as long spikelets, the regularly distichous, long-acuminate, narrower glumes, and the many-flowered spikelets with all the flowers bisexual. S.T. Blake l. c. p. 223 gives the following key characters.

F. fusca : glumes more than half as wide as long, 3-4 mm long; style about 3 mm long; culms 5-ribbed; leaves 2 mm wide; spikelets 1.5-2 mm wide.

F. stenochlaena : glumes about half as wide as long, 4-5 mm long; style 4 mm long; culms many ribbed; leaves 1.5-4 mm wide; spikelets 2-3 mm wide.

Like in most *Fimbristylis* spp., the width of the leaves and the number of flowers in the spikelets varies considerably. In the type collection of *F. fusca* (Wallich 3530) according to Kern (1974) the glumes are $4\frac{1}{2}-5\frac{1}{4}$ mm long, the style about 5 mm. The flowers of *F. stenochlaena* are triandrous (like in *F. fusca*) not diandrous as Kukenthal wrongly indicates. In my opinion *F. stenochlaena* cannot be treated as a distinct species.

Fimbristylis globulosa (Retz.) Kunth, Enum. 2: 231, 1837; Clarke in Hk.f. FBI. 6: 644, 1893 incl. var. *torresiana* Clarke; S. T. Blake in Journ. Arn. Arb. 35: 215, 1954; Kern in Blumea 8(1): 154, 1955, in Back. & Bakh.f. Fl. Java 3: 463, 1968 and in Fl. Males. (Ser. 1) 7(3) 551, 1974; Som Deva & Naithani in Ind. For. 100 (10): 650, 1974; *Scirpus globulosus* Retz. Obs. 6: 19, 1791; *Fimbristylis globulosa* (Retz.) Kunth var. *vicaryi* Clarke in Hk.f. FBI. 6: 645, 1893; *F. torresiana* Gaudich. in Freyc. Voy. Bot. 413, 1826.

A glabrous perennial with short rhizome. Stem erect, densely tufted, rigid, obtuse-angular or subterete, more or less flattened below the inflorescence, striate, smooth, 20-120 m by 1.5 mm. Cauline leaves reduced to bladeless, tubular, obliquely truncate, cinnamomeous-margined sheaths, the upper-most up to 20 cm; leaves of sterile shoots narrow, flat or canaliculate, about 1.5 mm wide;

lower sheaths with long leaves, uppermost sheath with a green leaf up to 2 cm long. Inflorescence with 1-numerous spikelets; involucre bracts very short, up to 1 cm long; spikelets globose to broadly ovoid, terete, obtuse, 4-5 mm by 3-4 mm; glumes ovate, obtuse, mucous, with broad hyaline margins, 2-2.75 mm long, the mid nerve ending somewhat below the apex; central sessile spikelets usually deficient. Stamens 2-3; anthers 0.5 mm long. Nut obovate, verruculose, 0.75-1 mm, the transversely oblong epidermal cells in 12-15 vertical rows on each face; stigma often 2, and then nut biconvex.

Dehra Dun *Vicary* (Clarke l.c.). I have never collected this species. The digynous plants, sometimes treated as a separate species (*F. terresiana* Gaudich) cannot, according Kern in Fl. Males. l.c., be segregated from the trigynous ones in a satisfactory way.

Fimbristylis multicephala Govindarajulu in Proc. Ind. Acad. Sci. 80(1): 44-46, f. 2, 1974.

Perennial. Rootstock woody. Culms glabrous, many ribbed, sulcate, caespitose, 2-4 noded, smooth, leafy at base, strong and rigid, flattened behind inflorescence, stramineous-brown, basally covered by 1-2 horny ovate lanceolate leafless sheaths, 20-30 cm \times 1 mm. Leaves few, grass like, glabrous, stramineous-brown, ligulate, flat, abruptly acute, many nerved, smooth, shorter than culms, 10-16 cm \times 1.8-2.0 mm, margin thickened, scabrid, sheath with glabrous membranous sides and hairy at mouth, transversely truncate. Anthela compound-decompound, multi-spiculate, corymbiform, 4-5 cm long and broad; bracts leaf like, glabrous at base, scabrid in the margin, as long as the inflorescence, stiff, erect. Primary rays 3-5, flattened, smooth at the margin, glabrous, up to 4.5 cm long. Basal glumes empty. Spikelets broadly ovoid, acute, dull brown, terete, always clustered (each cluster consisting of (2-) 3-6 (-8) spikelets), many flowered, 4.5 (lengthening up to 10 mm) \times 2 mm. Rachilla winged, excavated. Glumes broadly ovate, stramineous brown in upper half margin, glabrous, spiral, shining with narrow scarious margin and usually with faintly 1-nerved sides, subacute, 2.0 \times 1.6-2.0 mm; keel indistinct. 3-nerved; nerves sometimes excurrent into minute mucro; cells thick, narrow, vertically oblong, straight. Stamens 1-3; anther apiculate, minutely spurred at base, 0.5-0.6 mm long. Style flat, ligulate, hardly dilatated at base, fimbriate, up to 1 mm long; stigma 2, fimbriate, shorter than style, 0.5 mm long. Nut obovoid, biconvex, yellow, ultimately becoming dark brown, tuberculate, hardly umbonulate, stipitate, with thickened margin, crystalline 1.0-1.1 (incl. stipe) \times 0.75 mm; stipe 0.1 mm long;

outer cells in upper half distinctly impressed, transversely oblong, occurring in 9-10 regular vertical rows on each face.

Chir Plantation, Rajpur, Dehra Dun, Raizada s.n., H. B. Naithani 1888.

This novelty is very closely related to *F. dichotoma* (L.) Vahl, but differs in having flattened culm behind inflorescence, stiff erect glabrous bracts as long as the inflorescence, smooth margined primary rays and always clustered spikelets with respect to the occurrence of several fascicles of spikelets, this species has received the name "multicephala". As far as the occurrence of flattening of the culms behind the inflorescence and the stiff erect bracts which are as long as the inflorescence is concerned, this novelty bears a semblance to *F. complanata* (Retz.) Link.

Fimbristylis sieberiana Kunth, En. 2:237, 1837; Steud. Syn. 2:118, 1855; Kern Blumea 8(1): 131, 1955 et Fl. Males. (Ser. 1) 7(3): 572-573, 1974; Naithani & Raizada in Ind. F.r. (in press); *F. ferruginea* (non Vahl) Decne. Nouv. Ann. Mus. Hist. Nat. Paris 3:352, 1834; *F. ferruginea* var. *sieberiana* Boeck. Linnaea 37:17, 1871.

Clarke, Fl. Cap. 7:201, 1898 referred *F. sieberiana* to the synonymy of *F. ferruginea* (L.) Vahl, from which according to Kern (l.c.) it is specifically distinct. It can be distinguished by the following characters :

In *F. sieberiana*. cauline leaves well developed, less stiff, flat, up to 35 cm by 1.5-2 mm; lower sheaths herbaceous; laminiferous, stramineous or ferrugineous; sheaths of cauline leaves pilose, especially towards the top, finally more or less glabrescent. Lower involucre bracts as long as or usually distinctly over-topping the inflorescence up to 10 cm; spikelets obtuse, glumes very broadly ovate, usually dark castaneous, densely tomentose on the apical part, 3-4.5 mm long and wide. Style broader, about 0.4 mm wide. Nut broadly ovate or orbicular, distinctly stipitate, umbonulate, larger 1.25-1.5. While in *F. ferruginea* : lower sheaths bladeless, coriaceous, shining brown to castaneous, upper ones ferrugineous-membranous in front, ciliolate at the mouth. Involucre bracts 2-3, shorter than the inflorescence, scarious-margined at the dilated base. Spikelets solitary terete, acute, glumes ovate to oblong, obtuse, scarcely keeled, puberulous in the apical part, ferrugineous, 3-4 by 2.5-3 mm; style 0.25 mm wide. Nut ovate or oblong-obovate, shortly stipitate, 1-1.25 by 0.75-1 mm.

Saharanpur Gollan; Nakraunda, Dehra Dun Dist., Raizada s.n., H. B. Naithani Ser. II No. 66, 19th Oct. 1973.

Distribution :—India, Gujarat, Rajasthan, Uttar Pradesh,

Tamil Nadu, Maharashtra; S. Africa, Madagascar, Arabia, Persia, tropical Australia, Malesia.

A specimen of *Fimbristylis* collected by C.R. Babu 33257 from marshy limestone rocks of Robber's Cave (Fl. & Fr. Aug.-Nov.) resembles *F. dichotoma* (Linn.) Vahl, but differs in its habit, larger and fewer spikelets (0.7-0.8(-0.9) cm). Inflorescence a compound umbel, glumes 0.3 cm long, style 0.3-0.35 cm long. It may be an undescribed variety of the same.

Fimbristylis nutans (Retz.) Vahl. Enum. 2:285. 1806; Clarke in Hk.f. FBI 6: 632, 1893; S.T. Blake, Journ. Arn. Arb. 35:208, 1954; Kern in Blumea 8(1): 153. 1955, in Reinwardtia 6(1): 50, 1961 and in Fl. Males. (Ser. 1) 7(3): 589, 1974; Som Deva & Naithani in Ind. For. 100(10): 650, 1974; *Scirpus nutans* Retz. Obs. 4:12, 1786; *Iriha nutans* O.K. Rev. Gen. Pl. 2:753, 1891.

A glabrous perennial with very short rhizome. Stems slender, densely tufted, obtusely 3-4-angled, sulcate, smooth, 15-40 (-70) cm by 1/3-1 mm. Leaves reduced to tubular, bladeless or short bladed, stramineous or ferrugineous and castaneous verugated, 5-15 by 3-5 mm; rachilla narrowly winged. Glumes spiral, chartaceous, broadly ovate, very obtuse, apiculate, scarcely keeled, 3-5 (-9)-nerved in the centre, with shining brown, nerveless sides, 3.5-4.5 by 3-3.5 mm. Stamens 3, anthers linear, 1.5-2 mm. Style flat, relatively broad, liguliform, not on scarcely dilated at the base, ciliate in the upper half, 2.5-3.5 by 0.5-0.7 mm, stigmas 2, much shorter than the style. Nut biconvex or almost flat on the inner side, with obtuse edges, obovate, shortly and broadly stipitate, not or scarcely umbonate, tuberculate towards the margins or throughout, with 3-5 (-6) transverse wavy ridges, obscurely reticulate by the minute, hexagonal epidermal cells, whitish, 1.25-1.5 by 1-1.25 mm.

Swamp in Asarori Forest Block No. 7, Dehra Dun Som Deva 7601; Raizada s.n., growing in shallow slow moving water.

Distribution.—Khasi hills, Burma, Nicobars, Ceylon, South China, Formosa, Southwards to tropical Australia, Malesia.

Fuirena umbellata Rottb. Descr. & IC. 70, t. 19 (i.e.t. 18 altera), f. 3, 1773; Clarke in Hk. f. FBI. 6:666, 1893 and III. Cyp. t. 59, t. 9, 1909; Kuk. Bot. Jahrb. 59:52. 1974; Raizada in Ind. For. Rec. (n.s.) Botany 1(5) 235, 1939; S.T. Blake in Journ. Arn. Arb. 28:228, 1947; Kern in Back. & Bakh. f. Fl. Java 3:457, 1968 & Fl. Males (Ser. 1) 7(3): 518, 519, 1974; *F. pentagona* W. & A. ex Nees in Wight, Contr. Bot. Ind. 93, 1834 non Schum. Gun. Pl. 42, 1827.

A perennial with short thick rhizome. Stems tufted, erect, slender to rather stout, acutely 4-5-angular, pubescent in the

inflorescence or very rarely throughout, 30-110 cm by upto 8 mm at the base, the lowest internode not rarely bulbously thickened. Leaves much shorter than stems, rather rigid, flat, acute, glabrous or ciliate at the base, very rarely pubescent, with 5 prominent nerves, (5-) 8-15 (-25) mm wide, the lower ones very short, sheaths shorter than the internodes, usually glabrous. Inflorescence usually with a terminal partial inflorescence and several axillary ones, the latter single or binate, on pubescent peduncles. Lower bracts similar to the leaves, as long as or slightly over-topping the inflorescence, obliquely erect to patent, sheathing at the base; upper ones much shorter, not or hardly sheathing. Spikelets in very dense clusters, ovoid to oblong-ovoid, acute, finally more or less squarrose, brownish or greyish to blackish green, 4-10 by 2.5-3 mm. Glumes membranous, ovate, or obovate, rounded at the apex, short-hairy, pilose at apex, 2-2.5 by 1.25-1.55 mm, somewhat below the apex with a recurved, often pilose 0.75-9.4 mm long awn. Perianth usually uniseriate, bristles usually absent, very rarely present, but always much shorter than the nut; scales about as long as nut, subsessile, obovate, narrowed at the base, truncate at the somewhat thickened top, the mid nerve usually excurrent into a short curled mucro, minutely ciliolate at the apex, 3-nerved, brown. Stamens (2-) 3, anthers linear-oblong, 0.5-0.75 mm long. Nut elliptic to obovate, triquetrous, narrowed into a stipe and beak, smooth, shining stramineous to fuscous, 1-1.25 by 0.6-0.7 mm.

Pilibhit Dist., 27th January, 1918, *Sri Ram*.

Distribution :—Throughout warmer India, very common in rice-fields, from the Himalaya to Ceylon and the Malaya Peninsula; trop. Africa, S.E. Asia and Australia.

Rhynchospora longisetis R. Br. Prod. 230, 1810; Clarke in FBI. 6:669, 1893 et Ill. Cyp. t. 65, f. 2, 1909; Raizada in Ind. For. Rec. (n.s.) *Botany* 1(5):235, 1939; Kuk. Bot. Jahrb. 74:488, 1946; Kern in Fl. Males. (Ser. 1) 7(3) : 717-718, 1974; *Schoenus longisetis* Poir. in Lamk. Encycl. Suppl. 2:252, 1811.

An annual with fibrous roots. Stem tufted, slender, trigonous, striate, smooth, leafy at the base, 15-30 (-45) cm tall. Leaves shorter than stems, somewhat rigid, flat or complicate, gradually attenuate, scaberulous at the top, 1-2(-3) mm wide. Inflorescence a single globose or semiglobose dense head (2-) 2.5-3.5 cm across. Bracts 5-6, very unequal, patent or reflexed, sheathless, densely ciliate at the dilated base, not keeled, the lowest upto 10 cm. Spikeletes numerous, linear-lanceolate, acuminate, 2(-3?)-flowered, 11-14 mm long; lower flower female, perfecting a nut, upper one male. Glumes 6-7, distichous, acute, keeled, fulvous-ferrugineous. Bristles in the lower flower 6, 3 outer

ones densely plumose at the base on the outer side, otherwise antrorsely scabrous, 3 inner ones antrorsely scabrous (not or hardly plumose), 5 of them 8-12 mm long, 1 shorter (4-8 mm); in the upper flower bristles absent. Stamens 2; anthers 2.5-3 mm long, the base destitute of pollen. Style very long, shortly bilobed. Style-base oblong-conical, grooved on both sides, pale, antrorsely scabrous, $\frac{2}{3}$ to about as long as the nut and almost as broad at its apex, not decurrent on its shoulders. Nut oblong, strongly dorsiventrally compressed, hispidulous or tuberculate, especially towards the apex, minutely puncticulate, the sides slightly concave, the margins bordered by a pale line, brown, 3.5-4 by about 0.25 mm; epidermal cells isodiametric.

South Banda, 15th Oct. 1921, *Sri-Ram*.

Distribution :—Burma, Thailand, Cambodia, Malesia, N. Australia, N. Queensland.

Scleria biflora Roxb. Fl. Ind. ed. 2, 3:573, 1832; Clarke in Hk. f. FBI. 6:687, 1894 et Ill. Cyp. t. 127, f. 1-2, 1909; Kern in Blumea 11:197, 1961, and in Reinwardtia 6(1) : 75, 1965; Saxena in Ind. For. 93(5) : 329 & 93(9):657, 1967; Kern in Backer & Bakh. f. Fl. Java 3:486, 1968 and in Fl. Males. (Ser. 1) 7(3) : 743-744, figs. 106, 113, 1974; Som Deva and Naithani in Ind. For. 100(10) : 654, 1974; Naithani & Raizada in Ind. For. (in press).

Annual with fibrous, dark red roots, which strongly smell of camphor or cajaput. Stems slender, smooth, leafy (15-) 30-45 (-75) cm by 1-2 mm. Leaves weak, abruptly narrowed to the obtusish tip, glabrous or shortly pilose, 3-4(-8) mm wide; sheaths narrowly winged; contraligule rounded, ciliate (0.15-) 0.3-0.45 (0.75). Inflorescence narrow, elongate, consisting of 2-4 panicles, terminal panicle 2-4 cm long; spikelets either male and female or male and hermaphrodite. Male spikelets 3-4 mm long; stamens 2-3; anthers 1 mm long, nut bearing spikelets 3-4.5 mm long, with 1-2 male or barren flowers; nut globose or slightly depressed, regularly cancellate, beaked with the black or purplish persistent style-base, with 6 deep pits at the base (2 in each sinus of the disk-lobes), dull white, densely ferrugineous-pubescent on the walls between the pits (1.5-) 2 mm across.

Rajpur, Raizada s.n., *Som Deva* 11389, 5969, *H.B. Naithani* 1887; Laxman Sidh, Dehra Dun, *H.B. Naithani* 1889.

Distribution :—Lower Bengal, Cachar, Ceylon, S. China, Formosa, Malesia.

S. biflora is a well-marked species, readily recognisable by the globose, deeply cancellate, black-tipped nut deeply pitted between the long disk-lobes.

The above is referable to ssp. *biflora* Kern.

Scleria cariana (R. Br.) Benth. Fl. Austr. 7: 426, 1878; Clarke in Hk.f. FBI. 6: 688, 1894; Kern in Blumea 11: 208, 1961, & in Reinwardtia 6(1): 71, 1961; Raizada and Saxena in Ind. For. 88(9): 703, 1962; Kern in Back. & Bakh.f. Fl. Java 3:485, 1968 and in Fl. Males. (Ser. 1) 7(3): 749-751, fig. 106, 1974; Som Deva and Naithani in Ind. For. 100(10): 654, 1974; *Diplacrum carianum* R. Br. Prodr. 241, 1810.

A slender, glabrous annual. Stems diffuse or procumbent, triquetrous, smooth, (2-) 5-33 mm by 0.5-1 mm. Leaves rather abruptly narrowed to the acute tip, scaberulous on the margins in the upper part, 1-5 cm by (1.5-) 3-5 mm; sheaths not winged, widened upwards, truncate at the top. Inflorescence occupying by far the greater part of the stem, composed of several to numerous (upto about 20) remote, small, axillary clusters; primary bracts leaf-like; peduncles usually just exerted from their sheaths; terminal spikelet of each cluster female. Male spikelets 1-2 mm long, few-flowered; stamen 1; anther oblong; female spikelets without a trace of male flowers, finally almost cylindric, 2-3 mm long; glumes 2, ovate-lanceolate, several-nerved, 3-lobed, central lobe herbaceous, cellular-reticulate, above cuspidate, lateral lobes shorter, membranous. Disk obsolete, adnate to the nut, with a scarcely prominent 3-angled margin. Nut hidden by the connivent glumes and falling with them, depressed-globular to ovoid-globular, irregularly ribbed, slightly hispid at the top, white, finally more or less discoloured, 0.75-1 mm across.

Rajpur, Dehra Dun, frequent on open grassy slopes in Sal forest, *Saxena* 2291; *Raizada*, *Som Deva* 5320 & 5274; *H.B. Naithani* 3169 & 1877; Ramgarh, Dehra Dun, *Som Deva* 7661; Robber's Cave R. C. Babu 34932, *Raizada*, s.n.

Distribution:—Frequent from Sikkim Terai and Assam to Ceylon and Tenasserim; Malaya, China, Japan, Micronesia and Queensland.

Incidentally the correct name of *S. elata* Thw. Enum. Pl. Zeyl. 353, 1864, Hk.f. 6: 690, 1894 (incl. var. *laticl.* Cl. and *decolorans* Cl.), Duthie Fl. UGP 3: 368, should be *Scleria terrestris* (L.) Fass. in Rhodora 26: 159, 1924; Blake in Proc. Roy. Soc. Queensl. 62: 89, 1952; Kern in Blumea 11:170, 1961, as it is based on *Zizana terrestris* Linn. Sp. Pl. 991, 1753.

Scleria corymbosa Roxb. (Hort. Beng. 103, 1814 nom. nud.) Fl. Ind. ed 2,3: 574, 1832; Clarke in Hk.f. FBI. 6: 686, 1894 et Journ. Linn. Soc. Bot. 34: 97, 1898 et Ill. Cyp.t. 124,

f. 1-3, 1909; Merr. Enum. Philip. Fl. Pl. 1: 133, 1923; Kern in Blumea 11(1): 189, 1961 et Fl. Males. (Ser. 1) 7(3): 740, fig. 105 (1), 1974; Naithani & Raizada in Ind. For. (in press); *S. ridleyi* Clarke in Hk.f. FBI. 6: 686, 1894 et Journ. Linn. Soc. Bot. 34: 97, 1898 et Ill. Cyp. t. 124, f. 4, 1909; Ridl. Fl. Mal. Pen. 5: 177, 1925; *S. androgyna* Nees in Wight, Contr. 117, 1834.

A perennial with horizontal rhizomes. Stems often robust, erect, triquetrous, smooth or scaberulous in the upper part, upto 2 m by 1 cm. Leaves abruptly narrowed to the obtusish tip, glabrous, smooth or somewhat scaberulous on the margins near the top, 7-25 mm wide; sheaths loose, not winged, smooth or scaberulous on the angles, glabrous, contraligule broadly ovate-triangular, glabrous with a broad fuscous, scarious margin. Inflorescence often copious, upto 75 cm long, consisting of a few to several distant fascicles of panicles, lateral panicles 2-3 together at the nodes, rarely solitary, dense, decompound, corymbiform; peduncles very unequal, upto 10 cm, exerted from the sheaths; lower primary bracts usually overtopping the inflorescence, secondary bracts subulate. Spikelets bisexual and male, stramineous to dark-brown, 4-5 mm long; male spikelets lanceolate; stamens 3, anther about 2 mm long; bisexual spikelets broadly ovoid, with somewhat male flowers besides the female one. Disk obsolete, reduced to a brown or reddish, narrow, triangular, minutely glandular band concrete with the nut. Nut ovoid, obtusely trigonous, with 3 shallow depressions at the base, acute, hardly or not umbonulate, shining snowy white, rarely somewhat discoloured, 3-3.5 by 2-2.5 mm.

Bahraich, Uttar Pradesh *Sri Ram* 25th Sept., 1918.

Distribution:—India (Assam, Tamil Nadu, Karnataka, Andhra Pradesh, Kerala, Uttar Pradesh); Ceylon, South China, Malesia.

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[illegible]

CORRIGENDA & ADDENDA

Page 41 line 26
p. 48 line 72

for *Maytenus falconeri* (Lws.) M.A. Rau read *Maytenus falconeri* (Laws.) M.A. Rau
before *Derris macrocarpa* add
Derris kanihlathi Sahni et Nathani in Ind. For. 102(8):492-494, 1976.

A scandent shrub. *Stems* lenticelled. *Leaves* stipulate, 18-21 cm long; leaflets 9, 4-8 cm long 2-3.5 cm broad, ovate-oblong, entire, opposite, thin, notched at tip; petiolule 4 mm long, glabrous. *Inflorescence* a raceme, crowded at nodes; rhachis glabrous. *Flowers* 1 cm long, 4 mm broad, pedicellate; pedicels 3-8 mm long, glabrous. *Bracts* ovate; bractcole 2. *Calyx* cupshaped, 3 mm long, 2.5 mm broad, glabrous, entire or minutely toothed. *Corolla* eseried; standard 9-11 mm long, 3.5 mm broad, ovate-orbicular, wing 8 mm long, 2 mm broad.

Stamens 10, monadelphous. *Ovary* 8 mm long, 1 mm broad, pubescent; style glabrous. *Pods* 6-8 cm long, 1.7 cm broad with persistent calyx cup, faintly reticulate, glabrous, winged on both the sutures; wing \pm equal or well developed on upper surface.

Pilubhit, Sri Ram 246, holotype, DD.

This species is allied to *Derris monticola* (Kz.) Prain, but differs in glabrous nature of petiole, rhachis and pedicels; leaflets 9, ovate-oblong, notched at tip; calyx glabrous, entire or minutely toothed.

After *Phaseolus mukerjyanus* Babu ex Raizada sp. nov. add

Species haec arte iuncta est *Phaseolo* pubescenti, facile tamen distinguibilis ex eo quod habet valde densos et breves racemos atque stirpes, fulvos et pilosos foliitrunco atque peduncula, breviorum calycem atque corollam et stipulas angustiores et breviores.

After *Phaseolus Subramanianus* Babu ex Raizada sp. nov. add

Species haec arte iuncta est *Phaseolo* sublobato in indele sua vegetativa, facile tamen distinguibilis ex eo quod habet minute durata, brevia, cana et pilosa podia, parviorem corollam, breviorum calycem et magnos floriferos radios.

I am grateful to Rev. Fr. C.J. Matthew, Convent of Jesus & Mary, Mussoorie for the Latin translation of the two species of *Phaseolus* described above.

p. 55 line 29

p. 56 line 28

- p. 59 line 32 for *Trifolium alexandrinum* read *Trifolium alexandrinum*
- p. 69 line 2 for *Rosa moschata* J. Hermann read *Rosa moschata* Mill. ex J. Herrmann
- p. 71 line 31 for *Rotala ocutiflora* read *Rotala occuliflora*
- p. 72 line 10 for *Callistemon citrinus* (Curt.) Skeels (1913) read *Callistemon citrinus* (Curt.) Skeel in U.S. Dept. Agric. Bur. Pl. Ind. Bull. 282:49; 1913
- p. 72 line 13 After *Callistemon citrinus* Stapf in Bot. Mag. t. 90:50, 1925 add *Callistemon citrinus* Domin in Biblioth. 89:459, 1928
- p. 78 line 23 for *Vitis pentaphylla* Fl. Thunb. Jap. 105, 1784. read *Vitis pentaphylla* Thunb. Fl. Jap. 105, 1784.
- p. 94 line 15 for *Oldenlandia bracteata* read *Oldenlandia brachiata* Hk. f.
- p. 136 Before *Vicoa cerna* Dalz. add *Vernonia squarrosa* (D. Don) Less. in Linnaea 2:627, 1831 *Asclepias squarrosa* D. Don Prodr. Fl. Nep. 16, 1825; *Vernonia teres* Wall. ex DC. Prodr. 5:15, 1836; Hk. f. in Fl. Br. Ind. 3:229, 1881
- A rigid scabrid herb. Stem terete, pubescent or tomentose. Leaves scabrid on both surfaces, almost sessile, obovate or oblong. Heads 30-50-flowered large, solitary and axillary or a few terminal, purple. Achenes silky, pappus yellowish or reddish. Mala swamp. Gorakhpur dist., C.L. Malhotra 42655 collected 8th Oct. 1970.
- p. 156 line 20 for *Tylophora asthmatica* W & A) in Wiltg. Contr. read *Tylophora asthmatica* W. & A. in Wight Contr.
- p. 158 line 1 for THRETIACEAE read EIRATIACEAE
- p. 176 line 18 for *N.B. Naithani* 3232 etc. read *H.B. Naithani*
- p. 179 line 33 *Alectra parasitica* A. Rich. var. *chitrakutensis* M.A. Rau also reported from Madhya Pradesh.
- p. 198 line 18 for *Platystemma violoides* read *Platystemma violoides* Wall. in Pl. As. Rar. 2:52, t. 151, 1831

Before the description etc. of *Coleus forskohlii* add *Clinopodium umbrosum* (M. Bieb.) Koch in *Linnaea* 2:673; 1848, Singh in Bull. Bot. Surv. Ind. 6(2-4):305, 1964 et Bull. Bot. Surv. 11(1-2):16, 1969. *Calaminta umbrosa* Benth. in DC. Prodr. 12:232, 1848; Hk.f. in Fl. Br. Ind. 4:650, 1885. N. P. Singh has reported this from Anupshahr (No. 27406, collected 22-4-1963). This is a temperate Himalayan species occurring between 4000-12000 ft. I greatly doubt if it occurs in the plains. It is almost certainly a case of misidentification.

p. 240 line 5 for *Polygonum pulcherum* Bl. read *Polygonum pulchrum* Bl.

p. 259 line 10 for *Burkea scripta* Buch.-Ham read *Urtica scripta* Buch.-Ham.

p. 265 line 15 for *Hernium lanceum* (Thunb. ex Sw.) J. Vuyk read *Hernium lanceum* (Thunb. ex Sw.) J. Vuyk